

“It’s The Skin You’re In”: African-American Women Talk About Their Experiences of Racism. An Exploratory Study to Develop Measures of Racism for Birth Outcome Studies

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Abstract *Objectives* Stress due to experiences of racism could contribute to African-American women’s adverse birth outcomes, but systematic efforts to measure relevant experiences among childbearing women have been limited. We explored the racism experiences of childbearing African-American women to inform subsequent development of improved measures for birth outcomes research. *Methods* Six focus groups were conducted with a total of 40 socioeconomically diverse African-American women of childbearing age in four northern California cities. *Results* Women reported experiencing racism (1) throughout the lifecourse, with childhood experiences seeming

particularly salient and to have especially enduring effects (2) directly and vicariously, particularly in relation to their children; (3) in interpersonal, institutional, and internalized forms; (4) across different life domains; (5) with active and passive responses; and (6) with pervasive vigilance, anticipating threats to themselves and their children. *Conclusions* This exploratory study’s findings support the need for measures reflecting the complexity of childbearing African-American women’s racism experiences. In addition to discrete, interpersonal experiences across multiple domains and active/passive responses, which have been measured, birth outcomes research should also measure

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women's childhood experiences and their potentially enduring impact, perceptions of institutionalized racism and internalized negative stereotypes, vicarious experiences related to their children, vigilance in anticipating future racism events, as well as the pervasiveness and chronicity of racism exposure, all of which could be sources of ongoing stress with potentially serious implications for birth outcomes. Measures of racism addressing these issues should be developed and formally tested.

Keywords Race · Racism · Birth outcomes · African-American women

Background

Low birthweight (<2,500 g) and preterm delivery (<37 weeks) are two to three times more likely among African-Americans than Non-Hispanic Whites [1], a difference that has not been explained by well-established risk factors [2, 3]. These adverse birth outcomes predict infant mortality, as well as numerous other adverse outcomes across the life course, including child developmental deficits such as lower cognitive and educational achievement, and adult cardiovascular disease and diabetes [4–6]. Infections have been frequently cited as a potential explanation for these disparities. However, evidence on the role of infections is inconclusive [7, 8]. Further, a solely genetic explanation is unlikely given the favorable birth outcomes of immigrant black women [9, 10]. Attention is now being paid to the social context of pregnancy [11]. Within this context, racism has been hypothesized as a potential contributor to racial disparities in birth outcomes [3, 12–22].

While definitions of racism vary [23–26], all include the notion of unequal treatment based on skin color or other physical characteristics. Because these characteristics are immutable and often central to one's identity, racism constitutes a profoundly personal and severe threat to well-being [27]. We use "experiences of racism" to refer to a range of both direct and indirect experiences of unequal treatment based on race/ethnicity or skin color. Such experiences include thoughts and emotions about past and/or current race-based unfair treatment of oneself or others in one's group, as well as fear or anxiety about unfair treatment in the future.

Within the last decade, self-reported experiences of racism have been empirically linked with up to three-fold increases in adverse birth outcomes including low birthweight, very low birthweight, and preterm delivery [13, 19, 28, 29]. One recent study highlighted the importance of the life stage in which women's racism experiences occur [29]. Another study found that less educated Black women who

reported experiencing racism were at higher risk for preterm delivery than their more educated counterparts, suggesting that socioeconomic status (SES) may moderate the relation between racism and birth outcomes [20].

It is biologically plausible that racism could affect health, including birth outcomes, through physiologic pathways involving stress [8]. Racism is typically conceptualized in health research as a psychosocial stressor [24, 30]. Stress is a multidimensional construct involving exposure to a stressor, appraisal of its threat, and the cognitive, emotional, behavioral, and physiological responses corresponding to that appraisal [31]. Over time, adaptational responses to stressors, especially chronic or severe stressors, may produce physiologic wear and tear, or *allostatic load*, which can erode the body's ability to regulate key biological systems, thereby increasing disease susceptibility [32]. Several studies have noted an accelerated decline in African-American women's reproductive health with aging [33–35], which may reflect stress-related changes in neuroendocrine, immune, and/or cardiovascular functioning in response to chronic racism exposure [33–35]. One study showed that compared to White women, African American women have higher levels of allostatic load and experience premature physiologic aging during their reproductive years [36].

African-Americans have shown increased cardiovascular reactivity in response to racist stimuli in laboratory settings [37]. Both shorter gestational length and lower birthweight have been associated with greater blood pressure reactivity to a laboratory stressor in low-risk pregnant women [38]. African-American women have the highest rates of all racial/ethnic groups of hypertensive disorders in pregnancy [39]. African-American pregnant women also have the highest incidence of bacterial vaginosis, a urogenital infection linked to premature rupture of membranes, preterm labor and preterm delivery [40, 41], which has been associated recently with chronic stress in pregnant women [42]. Racism-related stress may also damage maternal and infant health by contributing to unhealthy coping behaviors, such as smoking [43] and alcohol consumption [44], both of which may be harmful to pregnancy.

Though research in this area is in its infancy, evidence of the effects of racism on the poor birth outcomes of African American women is growing. Findings, however, are mixed, which may owe in part to variations in measures used to assess racism. Measures of racism in published birth outcome studies have primarily explored discrete direct interpersonal events across life domains [3, 12–22]. Some investigators focus on recent experiences, while others assess whether a woman has "ever" experienced racism [12, 14, 15, 19–21, 27, 45], and a few have examined coping responses [13, 15, 19, 21]. In addition to these

factors, awareness of the ever-present possibility of discriminatory treatment may itself be a chronic stressor for people of color [46]. Moreover, accumulating literature on the health consequences of childhood stress [47–56] underscores the importance of considering racism experiences early in the life course [29]. Gender- and social role-related differences in experiences of racism also may be important [28, 30], particularly a mother's sense of obligation to protect her children from racism [16]. We were not able to identify birth outcome studies that have examined these latter issues. To inform the systematic development of more comprehensive measures of racism relevant to the experiences of African-American women of childbearing age, we conducted an exploratory qualitative investigation as a first step toward subsequently developing, testing, and using those measures to examine the role of racism in birth outcome disparities.

Methods

This study was approved by the University of California San Francisco Committee on Human Research. Using methods based on modified grounded theory [57, 58], we conducted six focus groups (5–10 women per group) with a total of 40 African-American women of childbearing age in San Francisco, Oakland, Berkeley, and Sacramento from May 2004 to April 2005. Focus groups are particularly well-suited for studying stigma-related experiences [59] and for research with ethnic minorities, who may minimize or deny discrimination experiences when queried individually, to appear less vulnerable [60, 62]. By emphasizing shared experiences, focus groups may lessen participants' discomfort with disclosing personal victimization [61].

Adult women (age 19 or older) with children under age 15, including pregnant women, who self-identified as African-American were eligible to participate. We aimed to recruit a socioeconomically diverse sample to better capture the range of racism experiences African-American women may encounter. To that end, we employed a purposive sampling strategy augmented with snowball sampling techniques. Partners with the public health departments/divisions of San Francisco, Sacramento, and Berkeley helped recruit lower SES women through the California Black Infant Health (BIH) Program, a state-supported prenatal outreach program targeting high-risk African-American women, and the Women, Infants and Children (WIC) nutritional supplementation program. Higher SES women were recruited through professional groups/networks and sororities. Eligible women who consented to participate were assigned to focus groups according to recruitment source (public programs versus

other), to increase the likelihood that participants would engage more easily in conversation with one another [63].

Data Collection

Each focus group was staffed by one facilitator and, for completeness and accuracy, two note-takers [64], all of whom were African-American women. Focus groups were approximately two hours long, audio-taped, and subsequently transcribed. After each focus group session, participants completed questionnaires providing sociodemographic information, including age, income, education, number of children, and household size. Each participant was paid \$50 and childcare was provided.

A semi-structured interview guide was developed by the "Measures of Racism Working Group," which consisted of the study investigators and our health department partners. The guide included open-ended questions intended to engage women in freely discussing their experiences with racism. For example, women were asked, "Now we would like you to think about particular experiences that you or someone close to you may have had with race or racism. Have you ever felt that you, or someone close to you, have ever been treated differently from others because of race?" A formal definition of racism was intentionally not given to avoid artificially constraining the way women understood "racism". Additional probes focused on childhood (under age 12) and adolescence (ages 12–19) and on emotional, somatic, cognitive, and behavioral responses to racism experiences (e.g., "What, if anything, went through your head when that happened?" and "How did you feel?"). As they became available, transcripts of completed interviews were read by primary coders, who helped modify the guides for subsequent groups to better capture emerging or missed issues [65].

Data Analysis

When data collection was complete, all transcripts were read by an interdisciplinary team of six coders with expertise in epidemiology; clinical, social, and developmental psychology; cultural anthropology; social welfare; and health and social policy. Using open-coding to identify emergent themes, coders followed an interactive and iterative process to reach consensus on major themes and develop higher-order constructs. Focus group data were organized/analyzed using ATLAS.ti 5.0 [66].

Results

The 40 focus group participants were between the ages of 18 and 39 (2 were <20 years old, 9 were aged 20–29, 17 were 30–39, and age information was missing for 12).

Characterizing their income per family size in relation to the federal poverty level (FPL), 9 women were poor (incomes <100% FPL), 9 were near-poor (101–200% FPL), 8 had incomes from 201% to 300% FPL, 5 from 301% to 400% FPL, and 9 had incomes over 400% FPL. Two participants had not completed high school, 3 had only a high-school education, 8 had some college education, 12 were college graduates; education information was missing for 15 women. Seventeen women had one child, 10 had 2 children, 7 had 3, and 6 women had 4 children. The youngest child's age was <1 year for 14 women, 1–2 years for 13 women, 3–4 years for 6 women, 5–6 years for 5 women, 7 or more years for one woman and missing for one woman.

As summarized in Table 1, content analysis of the focus-group data revealed six major themes characterizing the participants' self-reported experiences with racism: (1) Racism experiences occurred throughout the lifecourse, with childhood experiences seeming particularly salient and to have enduring effects; (2) The women experienced interpersonal, institutional and internalized forms of racism; (3) The participants experienced racism both directly and vicariously, the latter relating primarily to the racism experiences of their children; (4) Racism was experienced in various social settings; (5) The women had active and passive responses to racism, which manifested behaviorally, emotionally, cognitively, and somatically; and (6) The women maintained a pervasive sense of vigilance in anticipation of future racism events for themselves and their children, preparing themselves behaviorally, cognitively, and emotionally for potential racism encounters.

The Focus Group Participants Experienced Racism Across the Lifecourse; Childhood Experiences Appeared to Have Enduring and Particularly Painful Effects

Focus group participants reported racism experiences during childhood, adolescence, and adulthood. Childhood events often represented the women's first experience of "being different" or receiving negative reactions from others based on their race. These initial racism encounters were recalled vividly and with emotion, and appeared to have an enduring impact on the participants. Prejudice among playmates' families was commonly mentioned as the first introduction to racism. For example,

I used to play with this White girl every day, like she was my best friend...she would always come to my auntie's house. And then, there was one time where I went to her house, and she said, 'Well, my parents said we can't allow anybody (black) in the house.' And...that was something that always stayed with me my whole life. And that was really, for a little kid...heartbreaking, you know? And that's when I first learned that...there is a difference ...with the colors. I thought about it a lot. I still think about it.

Women also talked about being treated differently by childhood playmates. For example, one woman reported a deeply stigmatizing experience she had while playing with "little White girls":

Table 1 Emergent themes from focus groups with childbearing women exploring their experiences of racism

- (1) Racism experiences occurred throughout the lifecourse; childhood experiences appeared to have particularly painful and long-lasting effects.
- (2) The participants experienced racism directly and vicariously, the latter relating primarily to the racism experiences of their children.
 - Direct experiences refer to African American women's own racism encounters.
 - Vicarious experiences refer to those that are either the witnessed encounters of others or those reported by others such family, friends and co-workers.
- (3) The women experienced interpersonal, institutional and internalized forms of racism:
 - Interpersonal racism refers to encounters between individuals.
 - Institutional racism refers to the differential access to goods, services, and/or opportunities that stigmatized groups may experience, without necessarily involving any specific interpersonal encounter.
 - Internalized racism occurs when members of stigmatized groups consciously or unconsciously accept or believe negative stereotypes about their group and/or themselves as part of their group. Examples include embracing "whiteness," self-devaluation, resignation, and adopting behaviors that substantiate negative stereotypes.
- (4) Racism was experienced in various social settings: examples included work and school settings, in everyday social interactions such as shopping and in other settings defined by public space, and when interacting with health care, justice, and housing systems.
- (5) The women had active and passive responses to racism, which manifested behaviorally, emotionally, cognitively, and somatically:
 - Active reactions are discrete, outwardly observable actions taken in response to a racism event, such as expressing anger or hurt.
 - Passive reactions involve apparent non-response to a racism encounter, such as suppressing feelings or behaviors expressing those feelings.
- (6) The women maintained a pervasive sense of vigilance in anticipation of future racism events for themselves and their children, preparing themselves behaviorally, cognitively, and emotionally for potential racism encounters:
 - "It's the skin you're in," verbalized by one woman, seemed to capture the inescapable sense of pervasive awareness and vigilance that women in all the focus groups described experiencing on a chronic basis.

I always had to be the monster when we played games, and they said because you're black you're the black monster or the creature from the black lagoon, and it was because of the color of my skin and that stuck with me forever.

Another woman reported being called "nigger" by a little boy at school and wondered, "how a child that young could have that much hate? He didn't know anything about me. It just really stuck with me. I can still see his face."

During adolescence, women mentioned feeling excluded from leadership positions in their schools because of their race, and losing friends when their school social groups were segregated by race. Focus group participants described identifying with other African-Americans as well as other racial minorities while often referring to Whites as "others", noting that they "could be themselves" around other people of color, but often felt that they had to "change" (e.g., their speech, dress, etc.) when around Whites. Participants' exposure to overt and subtle racist events persisted into adulthood. Several participants reported their frustration that racism continues to exist. Responding to being called a "nigger" just a few years ago, one woman remarked, "*Wow, nothing has changed*".

Study Participants Experienced Interpersonal, Institutional, and Internalized Forms of Racism

Although interpersonal racism was the most commonly reported form of racism, the women also reported experiencing institutional and internalized racism. Central to women's reports of institutional racism was their awareness of structural inequalities between neighborhoods and schools segregated by race, noting differential access to healthy living environments, goods and services, and quality employment and educational opportunities. One woman observed,

There are too many liquor stores in a black neighborhood. [In] other neighborhoods there are grocery stores.

Another participant added,

The majority of African-Americans live in impoverished... neighborhoods, and ... I notice that those schools are really low quality in the impoverished neighborhoods, or the neighborhoods where there's people of color...

Generational disadvantage emerged as a sub-theme related to institutionalized racism. The women talked about the financial, social, and cultural privileges that Whites possess because of the historic advantages their race/skin color has afforded them. Women noted that, compared with Whites, their families had generally lacked access to the

opportunity, capital, knowledge and skill (e.g., how to invest in stocks or apply for a scholarship or loan) necessary for upward mobility.

Women further acknowledged struggling against accepting or internalizing negative stereotypes of African-Americans. For example, one woman expressed reservations about sending her children to a predominantly African-American school:

I know when I'm looking for schools...I'm like... 'am I just thinking this school is good because it's White and White folks are sending their kids there? And am I thinking this school is [just] okay because a lot of Black folks are there?' And that's sad when you are a Black person and you have to fight against your own stuff.

Women talked about stereotypical views and expectations others held of them, their friends, and family members, such as being a "welfare mom", an athlete, "different than those others" because of lighter skin complexion, and not being as smart, accomplished, and articulate as Whites.

The Women Experienced Racism Both Directly and Vicariously, Particularly in Relation to Their Children

Participants recounted many direct experiences with racism. However, their vicarious experiences, either witnessed by them or reported to them by family, friends, and other African-Americans in general, emerged as a powerful aspect of women's racism experiences. It was through their role as mothers, in particular, that the women reported feeling the greatest impact—albeit indirect—of racism:

I'm stressed because now that my kids are getting older, the school-age ones, they go through it all the time...So everyday I have to deal with that, so it's stressful. I take that in internally. It's subtle, it's not out in the open like slavery days, it's like hidden, but you feel it still. So I feel like I feel it everyday...Because as adults it seems like I could overlook it a little bit and not think about it everyday. But you have kids coming home everyday, oh he called me a nigger or black. That affects you as a parent... I go through the hurt when they go through the hurt.

Both their children's direct experiences and their anticipation of their children's potential exposure were identified as major sources of stress. Women talked extensively about feeling responsible for protecting their children against racism and trying to prepare them for dealing with it. They talked about their anxiety, even when their children were very young, about the future challenges their children would face. One mother reported:

I remember looking at my baby— he had to be about 2. I remember looking at him and saying, ‘Oh my God, what have I done [bringing him into the world]?’ And that’s a sad, sad, sad feeling ...because your child is supposed to be the happiest thing that you have on this earth and I’m looking at him going, ‘What have I done?’ My child is going to have to go through this life being black.

Women also described their efforts to counter their children’s internalizations of negative stereotypes. For example, one woman explained,

I’ve heard my son say to me, ‘Why don’t I have blue eyes?’ And I look at him [and say] ‘because I have brown eyes and your daddy has brown eyes. That’s why you have brown eyes. And be proud that you have beautiful brown eyes and nappy hair.’ So constantly having to fight against that and educating [my child].

Study Participants Experienced Racism in Many Different Domains and Settings

Women reported experiencing racism in employment, education, health, housing, legal, other services, and other everyday social settings. The workplace was a frequently mentioned setting for experiences of racism, where racist comments from co-workers and customers were commonplace. Women reported feeling “like a quota” and being treated as an expert on all African-American issues, a “black dictionary,” as one participant explained. A more subtle form of racism participants noted was the lack of support for career advancement compared to that of their White co-workers,

I can say, when I’ve worked in majority White organizations, I’ve never had the mentoring step that my White counterparts have had. Someone to see them through and help them navigate through the system.

Schools also were regularly mentioned as settings for racist experiences, for both the participants and their children. A predominant sub-theme (also related to institutional racism) was the lowered expectations that they felt teachers or the school system held for African-American students, with several women reporting teachers being surprised when they or their children did well academically. The participants felt they had to work harder, with less support, to prove themselves in school.

In the women’s everyday lives, shopping was a frequently mentioned context for racist experiences. Participants reported being followed in stores, ignored by clerks, and treated disrespectfully or with suspicion or disdain in public settings:

I was walking down the street and a White woman grabbed her purse....that’s something you always feel...because no matter what you have, you’re black first....they will kiss your behind as long as you have money, but they still see a nigger...

The Women’s Responses to Racism were Active and Passive, and were Manifested Behaviorally, Emotionally, Cognitively, and Somaticly

The women in the focus groups most commonly described active responses to racism encounters, characterized by open expression of emotion and concerted action, although passive responses, whereby women suppressed their feelings or ignored the situation, were also frequently reported. Emotional responses included feeling “tense”, “stressed”, “sad”, and “worthless”, and were often complex in nature, particularly anger. In more than one group, women talked about wanting to avoid the “angry black woman” stereotype, while simultaneously identifying anger as their typical response to racist situations:

...the thing is that... there’s never any pleasant or correct way to address it. All the things that I was thinking of saying to this lady, none of them would have come out right. They would have all come out bad... there’s an effort because you know, the angry Black woman thing...I really want to address things when they happen, I don’t want to walk away mad, I don’t want it to linger, you know. So, that’s one thing about this feeling, the angry feeling.

Cognitive responses included attempts to redefine, ignore, or simply accept racism as a part of “everyday life”:

Realistically it’s going to affect you. No one can say that they don’t care what people think, because you do care. It does bother you— you just put it in a different place.

Another participant stated, “I don’t think I really think about it. I just know it’s the skin you’re in. It’s just another part of your life.”

Somatic responses to racist encounters were also commonly described. When asked how they felt physically when a racist experience occurred, women reported feeling sick, having headaches, getting stomach aches, breaking out in hives, and shaking all over.

The Women Maintained a Pervasive Sense of Vigilance in Anticipation of Future Racism Events for Themselves and Their Children

Many participants reported thinking about their race or racism at least daily. This awareness often seemed to take

the form of conscious efforts to prepare themselves—through heightened awareness and altered behaviors—for situations where they were likely to face racist attitudes or behaviors. The anticipation of and preparation for potential racist encounters took behavioral, cognitive, emotional, and physiological forms. For example, one woman talked about dressing in a particular way to reduce the likelihood of a racist encounter while shopping:

...when I'm going shopping, I prepare myself...it's like I will take forever to find me something to wear because I feel I'm not going to be treated right...and I feel I shouldn't have to do that, but I do that because I'm treated different. I think when I go out everyday some situation is going to happen as far as racism.

In other cases, women described readying themselves emotionally, cognitively, and/or physiologically for anticipated encounters, such as this woman preparing for a conference at her child's school:

...it's like you get tense. Because you know...I know this person is going to say something that's going to make me, my heart rate [go up], or maybe have to hold back my tears while I'm talking to them. I don't want them seeing me crying, cause I don't want them thinking I'm sad, I'm not sad, I'm mad... you just get tense, cause you know you have to brace yourself for something stupid that they're gonna say... with a White person, you know that some level of racism is going to hop out of their mouth... And so you have to prepare your body for that.

Discussion

The six themes emerging from these focus groups confirm the relevance of aspects of experiences of racism previously measured in birth outcomes studies and also highlight issues deserving further consideration. Our findings support the need, addressed by several birth outcome studies, to assess discrete interpersonal racism events directly experienced across multiple life domains and capture both active and passive coping responses. However, our findings suggest that such an approach, in and of itself, is insufficient for capturing the full spectrum and complexity of African-American women's racism experiences. Based on the themes that emerged from the focus groups, there are a number of steps that researchers can take to more comprehensively assess the racism experiences of African-American women of childbearing age. Doing so may help to better elucidate the relationship between racism-related stress and poor birth outcomes:

First, the focus group results indicate that it is important to assess women's childhood racism experiences and the impact of those experiences across the lifecourse. Most instruments used in the racism and birth outcomes literature do not specifically measure childhood racism exposure, but focus instead on exposure during the perinatal period, the past year, or "ever" in one's lifetime. In our focus groups, the cognitive and emotional impact of women's childhood racism experiences was evident and seemed profound, even when recounting events later in life. Highly threatening situations in childhood may generate stress-induced emotional and physiological changes with long-range mental and physical health consequences, including poor birth outcomes [67]. For example, emotional stress responses have elicited physiologic responses such as cardiovascular reactivity, which can adversely impact the pregnancy outcomes of African-American women [37]. Occurring at a developmentally sensitive period of the life course, childhood racism experiences may adversely affect ethnic identity and self-concept, which have been demonstrated to protect ethnic minorities from the psychological harms of racism [68].

Second, the women in our focus groups expressed deep concern and anxiety over the racism experienced by their children. Similar to findings reported by Jackson et al. [16], our study participants verbalized feeling responsible for protecting their children from racism, suggesting that African-American women's social roles, particularly as mothers, may be important to consider when measuring their experiences of racism. The stress experiences of close others can also impact one's own emotional and physical well-being [69]. Thus, these women's vicarious racism experiences, particularly those related to their children, may add considerably to their overall level of stress. Two of the eleven existing birth outcome studies use measures that capture women's vicarious racism experiences, such as those experienced by a close family member or friend [21, 29]. Only one of these studies, to our knowledge, has specifically assessed women's vicarious experiences during their own childhood, which were a significant independent predictor of their infants' birthweight [29]. Several women in our study discussed how the racism experiences faced by their children brought back memories of their own childhood experiences, suggesting potential links between these two aspects of women's racism experiences.

Third, our findings suggest that institutional and internalized forms of racism may also contribute to African-American women's racism-related stress burden. Theories of weathering [70] and stress age [34] explain how increasing stress loads accelerate physiologic deterioration and increase a woman's risk of adverse reproductive outcomes. Focusing exclusively on direct, interpersonal racism exposures may seriously underestimate the racism-related stress a woman experiences.

Fourth, besides measuring exposure to perceived racism events, our findings suggest that it is important also to measure the pervasive vigilance with which African-American women anticipate future racism encounters and consider the effects that such chronic hyperarousal could have on pregnancy. The women in our study vividly described their cognitive, behavioral, and physiologic preparation for potential racism threats. Chronic hyper-vigilance in anticipation of unfair treatment could damage multiple organ systems and immune defenses [32], thereby producing poor birth outcomes.

Finally, this study's findings suggest that African-American women's racism experiences start early in life and continue pervasively throughout the lifecourse. As described previously, racism measures used in birth outcome studies tend to assess racism experiences by focusing on incidents that an individual, or someone close to her, has experienced during pregnancy, in the past year, or ever. Our results indicate the importance of assessing the chronicity of racism experiences throughout African-American women's lives.

Limitations of this exploratory study include the small size and that the Northern California convenience samples may not be nationally representative. This study did not aim to test hypotheses about racism's health effects or develop new measures; rather, it engaged women in verbalizing their experiences, to provide a basis for developing more adequate measures for birth outcomes research in the future.

Although education information was frequently missing, poverty status was described for all 40 women and the sample appeared socioeconomically diverse. Our impression was that women in the groups recruited from public programs ("low SES") reported more childhood and direct racism experiences, and appeared to internalize experiences of racism more than the women in the other groups ("moderate/higher SES"). However, this study was not designed to draw conclusions about socioeconomic differences in racism experiences; furthermore, the demographic information collected at the end of focus group sessions showed some overlap in income and education levels between the "low SES" and "moderate/high SES" groups. Relatively little attention has been paid to socioeconomic variation in perceptions of racism. However, racism experiences and responses to those experiences could vary by socioeconomic status/position (SES) [71]. Given differences in the types of social institutions and interpersonal situations that African-Americans of different social standing are likely to encounter on a regular basis, higher SES African-Americans may score higher on measures assessing subtle, institutionalized forms of racism, while lower SES African Americans may score higher on measures capturing exposure to blatantly unfair treatment [24]. In subtle or ambiguous situations,

socially disadvantaged groups have attributed negative experiences to their own personal inadequacies rather than to discriminatory treatment [72, 73]. Both positive and negative associations between racism and SES have been reported, the nature of which may depend on how racism is measured [24]. Socioeconomic differences in experiences of racism should be considered in developing and testing measures. Birth outcomes studies should also consider the suitability of instruments used to measure institutional and internalized racism in studies of other health outcomes.

Conclusion

The insights from this exploratory study should inform the development of more comprehensive racism measures, and should be tested with socioeconomically diverse African-American women in diverse settings. We conclude that further work is needed to ensure that racism measures in birth outcome studies adequately capture women's childhood experiences, the potentially enduring impact of those experiences, perceptions of institutionalized racism and internalized negative stereotypes, women's vicarious experiences specifically related to their children, and the pervasiveness and chronicity of African-American childbearing women's racism experiences. These different but not necessarily mutually exclusive aspects of women's racism experiences could be important sources of chronic psychological stress with serious impacts on health, including birth outcomes. Our findings underscore the multidimensional nature of racism as a lived experience, and emphasize the inherent complexities involved with measuring it and quantifying its effects. The themes emerging from the focus groups suggest several new directions for improving the measurement of racism for African-American women of childbearing age. More comprehensive racism measures may enhance our understanding of the association between racism and birth outcomes and guide work to elucidate specific psycho-physiologic pathways through which racism experiences adversely affect pregnancy outcomes.

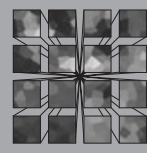
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A methodological note on modeling the effects of race: the case of psychological distress

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Summary

Psychological distress is an important indicator of the mental well-being of the population. Findings regarding racial differences in distress are inconclusive but may represent an important pathway through which disparities exist across a number of physical health outcomes. We used data from the 1994 Minority Health Survey, a nationally representative multiracial/ethnic sample of adults in US households, to examine racial/ethnic differences in psychological distress (n = 3623). Our primary study aim was to examine differences between additive and multiplicative models in assessing the influence of income and gender on the race/distress relationship. We hypothesized that additive models do not sufficiently account for potential interactions of race with income and gender, and may therefore mask important differences in distress between racial groups. The results suggest that our hypotheses were supported. After adjusting for income, there were no statistically significant differences in distress levels between racial groups. However, significant differences emerge when multiplicative models are used demonstrating the complexities of the intersection of race, income and gender in predicting psychological distress. Black men and women of higher income status represent a particularly vulnerable group, whereas Hispanic men are especially hardy. We discuss the implications of our findings for future work on racial health disparities. Copyright © 2008 John Wiley & Sons, Ltd.

Key Words

race; income; gender; psychological distress; psychosocial stress

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Introduction

It has been suggested that disparities exist in the levels of psychological distress experienced between racial/ethnic groups in the United States. Psychological distress is important for at least two reasons. One, it is an indicator of the general

psychological well-being of the population (Zahran, Kobau, Moriarty, Zack, & Giles, 2004); and two, it may represent an important pathway through which racial disparities exist across a number of physical health outcomes (Pratt, Dey, & Cohen, 2007). A review of previous literature indicates conflicting findings regarding racial disparities in psychological distress. Several factors may account for these inconsistencies. First, definitions of psychological distress vary ranging from clinical diagnosis (e.g. depression, schizophrenia, generalized anxiety disorder) to subclinical but disorder-specific symptomatology (most commonly depressed mood) to non-specific distress typically measured by assessing the presence and/or severity of symptoms common to many mental illnesses but together not specific to any one (e.g. depressed mood, anxiety, positive affect, behavioural/emotional control) (Kessler, 1979; Neighbors, 1984; Warheit, Holzer, & Schwab, 1973; Pratt et al., 2007; Skapinakis, 2007; Williams, Takeuchi, & Adair, 1992; Williams, Yu, & Jackson, 1997). These differences in defining (or operationalizing) psychological distress likely contribute to the inconclusive nature of previous study findings. Further, it has been suggested that whereas clinical diagnosis and disorder-specific symptomatology are useful for determining the prevalence of specific disorders, non-specific measures may better capture the range of psychological suffering in the population given their ability to capture those who are either not distressed enough to meet standard criteria for mental illness (Horwitz, 2007; McVeigh et al., 2006) or do not fit neatly into any one disorder category (Aneshensel, 2002; Dohrenwend, Shrout, Egri, & Mendelsohn, 1980; Mirowsky & Ross, 2002). Rather, they are indicative of suboptimal psychological functioning which studies have shown may have important consequences for numerous physical health outcomes, including coronary heart disease, stroke and diabetes (Cohen, Tyrrell, & Smith, 1993; Gallo & Matthews, 2003; Johnson, 1989; May et al., 2002; Stansfeld, Fuhrer, Shipley, & Marmot, 2002; Rutledge & Hogan, 2002 as well as subsequent mental disorder (Mirowsky & Ross, 2002).

Second, most previous studies examining racial differences in distress have used region-, state- or city-specific samples compromising the generality of study findings and the ability to compare findings across studies (Dohrenwend, 1973; George & Lynch, 2003; Kessler, 1979; McVeigh et al., 2006; Neighbors, 1984; Williams et al., 1992;

Williams et al., 1997). Third, most of these studies have focused on black-white differences and therefore have not been able to ascertain differences that may exist with other race/ethnic groups, particularly Hispanics who represent a rapidly growing population in the United States (Bratter & Eschbach, 2005; McVeigh et al., 2006; Pratt, et al., 2007). Finally, most studies examining racial differences in distress have controlled for income. Studies examining the intersection of race and income suggest that controlling for income may mask important differences between racial/ethnic groups (Cockerham, 1990; Kessler & Neighbors, 1986; Ulbrich, Warheit, & Zimmerman, 1989; Belgrave, Wykle & Choi, 1993).

In this paper, we attempt to overcome the limitations of previous work by using a nationally representative multiracial/ethnic sample to examine the relationship between race/ethnicity and a validated and highly reliable measure of non-specific psychological distress. In addition, we employ both additive and multiplicative (i.e. interaction) models to assess the influence of both income and gender on the race/distress relationship.

Methods

Sample

Data for this study come from the 1994 Minority Health Survey (MHS), a cross-sectional telephone survey of a nationally representative sample of non-institutionalized adults ages 18 years and older residing in households within the 48 contiguous US. Data were collected via random digit dialing procedures using a stratified sampling design intended to capture a representative proportion of households from each of three urbanization categories defined by the US Bureau of the Census: (1) central city; (2) suburban; and (3) rural (Hall, 2000). African Americans and Hispanics were oversampled. Post-sampling weights based on the 1993 Current Population Survey were used to correct for oversampling. For the present study, we used the subsample of respondents that self-identified as either being of Hispanic origin or descent or as non-Hispanic African American, white, or Asian or Pacific Islander (API); and for whom we had complete data on psychological distress ($n = 3623$). The overall response rate for the MHS was 60 per cent. Further details of the sampling design are provided elsewhere (Hall, 2000).

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Measures

Psychological distress was measured using the five-item Mental Health Inventory (MHI-5), an abbreviated version of the 18- and 38-item MHIs (Ware, Kosinski, Bayliss, & McHorney, 1995). The MHI was the primary mental health assessment tool used in two classic studies, both conducted by the RAND Corporation: the Health Insurance Experiment (1974–1982) (Newhouse, 1974) and the Medical Outcomes Study (1986–1987) (Hays, Sherbourne, & Mazel, 1995). The MHI-5 has shown a high degree of correlation with both the 18- and 38-item instruments as well as several other measures of psychological well-being including the CES-D and the General Health Questionnaire (Berwick et al., 1991; Hoeymans, 2004; McCabe, Thomas, Brazier, & Coleman, 1996; Shaw, Treglia, Motheral, & Coons, 2000). The five-item version of the scale has been used in numerous studies as a non-specific measure of psychological distress with alpha coefficients ranging from 0.76 to 0.88 (McCabe et al., 1996; Shaw et al., 2000; Stewart, Hays, & Ware, 1988; Williams, 2000). The MHI-5 asks respondents how often, over the past month, they have been a happy person, felt calm and peaceful, been a very nervous person, felt downhearted and or blue, felt so down in the dumps that nothing could cheer them up (Williams, 2000). Responses were coded using a six-point Likert scale ranging from ‘never’ to ‘always’ and summed into a psychological distress score ranging from 5 to 30. The two positive valence items (i.e. happy, calm and peaceful) were reverse coded so that higher scores reflected higher levels of distress.

To assure mutually exclusive race/ethnic groups, binary variables were created for each racial ethnic group indicating whether or not (1 = yes, 0 = no) the respondent self-identified as either non-Hispanic white, non-Hispanic black or African American, non-Hispanic Asian, or Hispanic. Respondents self-reporting as Native American or ‘other’ were excluded from the analysis because of inadequate representation in the data. The MHS categorized respondents into 1 of 8 income categories reflecting respondents’ gross annual household income from all sources. Income categories ranged from \$7500 or less to \$100,000 or over. To retain the income continuum without being restricted to artificial cut-points, we used income as a continuous variable ranging from 1 to 8 with higher numbers reflecting higher income-levels. Gender is a binary variable. Education, marital status, age, health problems, negative life events and household size

were included as covariates because of their potential association with psychological distress.

Analysis

In bivariate analyses, correlations, *t*-tests and analysis of variance tests were used, as appropriate, to examine the characteristics of the study sample and crude measures of association between study variables. In order to examine both the crude effect of race on psychological distress and how the effect of race on distress might vary with the addition of Potential confounders and/or by specifying a race-by-income interaction, we conducted a series of nested multivariate ordinary least squares regressions. Our base unadjusted model examining the main effect of race on psychological distress (Model 1) was specified as follows:

$$Y = \beta_0 + \beta_1\text{Black} + \beta_2\text{Hispanic} + \beta_3\text{API} + e \quad (1)$$

where β_0 is the intercept, or mean level of distress, for the reference group (i.e. whites), β_i is the intercept (i.e. mean) for each of the other racial groups relative to whites, and the *p*-value indicates whether β_i is significantly different from β_0 . This model specification differs from the typical specification that dummy-codes one race variable with several categories representing the various racial/ethnic groups. We specified the model this way to avoid restricting each race group to the same (i.e. fixed) intercept.

Subsequent models build on this base model. In Model 2, we examined how the effect of race on distress varied after adjusting for income and household size. Model 3 added an adjustment for gender. In Model 4, we added three race-by-income interaction terms.

$$Y = \beta_0 + \beta_1\text{Black} + \beta_2\text{Hispanic} + \beta_3\text{API} + \beta_4\text{Income} + \beta_5\text{Household size} + e \quad (2)$$

$$Y = \beta_0 + \beta_1\text{Black} + \beta_2\text{Hispanic} + \beta_3\text{API} + \beta_4\text{Income} + \beta_5\text{Household size} + \beta_6\text{Gender} + e \quad (3)$$

$$Y = \beta_0 + \beta_1\text{Black} + \beta_2\text{Hispanic} + \beta_3\text{API} + \beta_4\text{Income} + \beta_5\text{Household size} + \beta_6\text{Gender} + \beta_7\text{Black} \times \text{Income} + \beta_8\text{Hispanic} \times \text{Income} + \beta_9\text{API} \times \text{Income} + e \quad (4)$$

$$Y = \beta_0 + \beta_1\text{Black} + \beta_2\text{Hispanic} + \beta_3\text{API} + \beta_4\text{Income} + \beta_5\text{Household size} + \beta_6\text{Gender} + \beta_7\text{Black} \times \text{Income} + \beta_8\text{Hispanic} \times \text{Income} + \beta_9\text{API} \times \text{Income} + \beta_{10}\text{Education} + \beta_{11}\text{Health problems} + e \quad (5)$$

$$\begin{aligned}
 Y = & \beta_0 + \beta_1 \text{Black} + \beta_2 \text{Hispanic} + \beta_3 \text{API} + \\
 & \beta_4 \text{Income} + \beta_5 \text{Household size} + \\
 & \beta_6 \text{Gender} + \beta_7 \text{Black} \times \text{Income} + \\
 & \beta_8 \text{Hispanic} \times \text{Income} + \beta_9 \text{API} \times \\
 & \text{Income} + \beta_{10} \text{Education} + \quad (6) \\
 & \beta_{11} \text{Health problems} + \\
 & \beta_{12} \text{Marital status} + \beta_{13} \text{Age} + e
 \end{aligned}$$

where the β coefficient for each of the interaction terms is the slope of the line indicating the magnitude and direction of the relationship between income and psychological distress for each racial group. Here, the p -value indicates whether the slope of the line for each racial group is significantly different from that of whites (reference group). Model 5 provided further adjustment for education and health problems. And the final model (Model 6) adjusted for marital status and age. Marital status and age were added in a step separate based on preliminary analysis suggesting that they have a particularly strong association with both race and psychological distress. Based on the inconclusive nature of previous studies regarding the role of negative life events, we conducted Sobel–Goodman

mediation tests to determine the appropriateness of including life events in multivariate models. Our results show that negative life events mediates the race–distress relationship and was, therefore, excluded from final analyses.

To examine the three-way interaction of race with both income and gender, we examined the two-way race-by-income interaction within gender-stratified groups. Whether or not a three-way interaction exists was based on whether the race-by-income interaction was the same across gender sub-groups. All data analyses were conducted using STATA version 9 (Stata Corporation, 2007).

Results

Sample characteristics

Sample characteristics are shown in Table I. Each racial group comprises approximately 27 per cent of the study sample with the exception of Asians, who comprise 16.6 per cent. There are approximately equal numbers of men and women,

Table I. Characteristics of study sample ($n = 3789$).

	Total <i>n</i> (per cent)	White <i>n</i> (per cent)	Black <i>n</i> (per cent)	Hispanic <i>n</i> (per cent)	API <i>n</i> (per cent)
Gender					
Men	1931 (51.4)	582 (52.8)	500 (50.3)	507 (50.9)	306 (50)
Women	1829 (48.6)	520 (47.2)	495 (49.7)	490 (49.1)	306 (50)
Income (mean, SD)	37,901 (28,647)	42,140 (31,047)	33,883 (26,858)	34,914 (25,461)	41,448 (30,223)
Age (mean, SD)	43 (16)	48.4 (17.4)	44.7 (15.7)	39.3 (13.6)	39.1 (13.9)
Marital status					
Married	1954 (52)	616 (56)	412 (41.5)	519 (52.1)	380 (62.3)
Not married	1801 (48)	484 (44)	582 (58.5)	478 (47.9)	230 (37.7)
Education					
Less than high school	1051 (16.2)	111 (10.1)	175 (17.6)	193 (19.5)	112 (19.2)
High school diploma only	1107 (29.7)	362 (32.9)	313 (31.5)	295 (29.7)	127 (21.7)
Some college	961 (25.8)	286 (26)	269 (27.1)	299 (30.1)	88 (15)
College graduate	1051 (28.3)	341 (31)	236 (23.8)	718 (73)	258 (44.1)
Employment					
Employed	2516 (68)	702 (64.5)	656 (67.8)	266 (27)	400 (66)
Not employed	1185 (32)	386 (35.5)	312 (32.2)	880 (88.6)	207 (34)
Health problems					
No	3240 (86.5)	923 (84)	831 (83.7)	113 (11.4)	564 (92.8)
Yes	505 (13.5)	176 (16)	162 (16.3)	26.8 (3.9)	44 (7.2)
Negative life events (mean, SD)	26.5 (4.2)	25.7 (3.8)	27.0 (4.2)	11.3 (4.3)	26.4 (5.2)
Psychological distress (mean, SD)	11.0 (4.3)	10.7 (4.2)	11 (4.5)		11 (3.9)

API: Asian/Pacific Islander; SD: standard deviation.

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and married and unmarried persons. The majority of the sample is employed (68 per cent), has graduated high school (84 per cent) and is in generally good health with only 14 per cent of people reporting health problems that prevent them from participating fully in normal daily activities such as going to school or work. The average age of the sample is 43 years ranging from 18 to 94 years. Average annual income is \$37,901 but varies widely from \$3,750 to \$125,000.

On average, whites fare better than the total sample across a number of social characteristics. They have a higher average income and more of them are married and have graduated from high school ($p = 0.000$). Asians are similar in this regard. In addition to faring better on the aforementioned characteristics, far more Asians are college graduates compared with both the total sample and all other race groups ($p = 0.000$). They also exhibit fewer health problems ($p = 0.000$). Blacks and Hispanics, on the other hand, have lower average incomes than the total sample and fewer of them have graduated from college ($p = 0.000$). Of all race groups, fewer blacks are married ($p = 0.000$).

Nested multivariate results

Multivariate analyses examined the subsample of MHS participants who responded to each of the items comprising the MHI-5 and for whom we had data for each of the other study variables ($n = 3587$). We examined the effects of race on psychological distress in nested multivariate models to examine both the unadjusted effect of race on distress and the extent to which that effect varies with the addition of other variables expected to confound the race/distress relationship. We were particularly interested in how the main effect of race on distress might vary after interacting race with income given the primary reliance of previous work on using additive effects to demonstrate the race/distress relationship when accounting for income.

Full sample. Results for the full sample are presented in Table II. In Model 1, we examined the unadjusted effect of race on psychological distress which shows Hispanics and blacks reporting significantly higher adjusted mean levels of distress compared with whites. Model 2 shows that after adjusting for income, blacks' and Hispanics' level of distress remain higher than whites, but not significantly so. Income, on the other hand, shows

a significant inverse relationship with psychological distress such that distress decreases as income increases. Next, we adjusted for gender (Model 3), which did not affect the effect of race on psychological distress.

In the next model (Model 4), we added interaction terms to examine whether the relationship between race and distress varies across the income gradient. These data show a significant interaction effect for blacks such that the previously reported inverse relationship between income and psychological distress is stronger for blacks than it is for whites. Further, the difference in average distress scores between blacks and whites re-emerges; and the magnitude of this difference is considerably higher once the interactions are included in the model. These data indicate that the greater distress levels reported by blacks are most pronounced at lower income levels.

Further adjustment for education and health problems (Model 5) attenuates the mean difference in psychological distress between blacks and whites; however, the effect for Hispanics re-emerges. Finally, we added marital status and age (Model 6) and found that the only significant race effect remaining was the income-by-race interaction among blacks.

Gender stratified groups: three-way interaction test. Our next set of results reports the findings of gender-stratified analyses where we again used nested models to examine the three-way interaction of race with both income and gender (Tables III and IV) in predicting risk for psychological distress. As described above, whether or not a three-way interaction exists is based on whether the two-way race-by-income interaction is consistent across gender subgroups.

Nested results for men. Similar to the findings reported for the full sample, among men the addition of income reduces all race effects to non-significance (Model 2, Table III). However, after adding the race-by-income interaction (Model 3), sizeable racial differences in average distress scores are observed for black and Hispanic men, both having significantly higher adjusted mean levels of distress than white men. The race-by-income interaction is also significant indicating that the previously reported inverse income-distress relationship is stronger for black men than for white men, as was observed among the full sample. Also consistent with the findings for the full sample, the addition of education and

Table II. Nested multivariate regression of psychological distress on race for full sample ($n = 3587$).

	Model 1: race		Model 2: income		Model 3: gender		Model 4: Race × Income		Model 5: education and health problems		Model 6: marital status and age	
	β	SE	β	SE	β	SE	β	SE	β	SE	β	ED
Black	0.32*	0.19	0.06	0.19	0.04	0.19	0.80*	0.44	0.71	0.44	0.52	0.43
Hispanic	0.58***	0.19	0.32	0.19	0.31	0.19	0.64	0.47	0.92**	0.46	0.55	0.46
API	0.24	0.22	0.12	0.22	0.09	0.22	-0.53	0.55	-0.05	0.54	-0.14	0.54
Income	—	—	-0.44***	0.04	-0.41***	0.04	-0.36***	0.07	-0.23***	0.07	-0.17***	0.07
Household size	—	—	0.13**	0.05	0.13***	0.05	0.13***	0.05	0.15***	0.05	0.12**	0.06
Gender	—	—	—	—	0.84***	0.14	0.83***	0.14	0.79***	0.14	0.78***	0.14
Black × Income	—	—	—	—	—	—	-0.19**	0.10	-0.16	0.10	-0.16*	0.10
Hispanic × Income	—	—	—	—	—	—	-0.08	0.10	-0.12	0.10	-0.11	0.10
API × Income	—	—	—	—	—	—	0.14	0.11	0.08	0.11	0.05	0.11
Education	—	—	—	—	—	—	—	—	-0.18***	0.06	-0.24***	0.06
Health problems	—	—	—	—	—	—	—	—	2.20***	0.21	2.38***	0.21
Marital status	—	—	—	—	—	—	—	—	—	—	0.71***	0.16
Age	—	—	—	—	—	—	—	—	—	—	-0.03***	0.00
Adjusted R^2	—	—	—	—	—	—	—	—	—	—	—	0.10

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

Black (1 = yes, 2 = no); Hispanic (1 = yes, 2 = no); API (1 = yes, 2 = no); gender (1 = women, 2 = men); health problems (1 = yes, 0 = no); marital status (1 = not married, 0 = married).

API: Asian/Pacific Islander; SE: standard error.

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Table III. Nested multivariate regression of psychological distress on race among men (three-way interaction test; $n = 1842$).

	Model 1: race		Model 2: income		Model 3: Race × Income interactions		Model 4: education and health problems		Model 5: marital status and age	
	β	SE	β	SE	β	SE	β	SE	β	SE
Black	0.26	0.24	0.02	0.24	1.37**	0.62	1.35**	0.61	1.28**	0.61
Hispanic	0.61***	0.24	0.35	0.25	1.37**	0.64	1.45**	0.63	1.20**	0.62
API	0.53*	0.29	0.39	0.29	0.33	0.76	0.71	0.75	0.79	0.75
Income	—	—	-0.41****	0.05	-0.27***	0.09	-0.18**	0.09	-0.12	0.09
Household size	—	—	0.05	0.07	0.05	0.07	0.07	0.07	0.06	0.08
Black × Income	—	—	—	—	-0.31**	0.13	-0.29**	0.13	-0.30**	0.13
Hispanic × Income	—	—	—	—	-0.23*	0.13	-0.23*	0.13	-0.22*	0.13
API × Income	—	—	—	—	0.02	0.16	-0.01	0.15	-0.08	0.15
Education	—	—	—	—	—	—	-0.08	0.08	-0.12	0.08
Health problems	—	—	—	—	—	—	2.10****	0.29	2.30****	0.29
Marital status	—	—	—	—	—	—	—	—	0.55***	0.21
Age	—	—	—	—	—	—	—	—	-0.03****	0.01
Adjusted R^2										0.09

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

Black (1 = yes, 2 = no); Hispanic (1 = yes, 2 = no); API (1 = yes, 2 = no); gender (1 = women, 2 = men); health problems (1 = yes, 0 = no); marital status (1 = not married, 0 = married).

API: Asian/Pacific Islander; SE: standard error.

Table IV. Nested multivariate regression of psychological distress on race among women (three-way interaction test; $n = 1745$).

	Model 1: race		Model 2: income		Model 3: income–race interactions		Model 4: education and health problems		Model 5: marital status and age	
	β	SE	β	SE	β	SE	β	SE	β	SE
Black	0.30	0.28	0.05	0.28	0.26	0.64	0.11	0.63	-0.17	0.62
Hispanic	0.50*	0.29	0.22	0.29	-0.09	0.69	0.38	0.68	-0.10	0.67
API	-0.12	0.33	-0.28	0.34	-1.34*	0.80	-0.80	0.78	-1.06	0.78
Income	—	—	-0.41****	0.06	-0.46****	0.10	-0.28***	0.11	-0.21**	0.11
Household size	—	—	0.23***	0.08	0.24***	0.08	0.25***	0.08	0.18	0.09
Black × Income	—	—	—	—	-0.07	0.15	-0.01	0.15	-0.03	0.15
Hispanic × Income	—	—	—	—	0.08	0.15	-0.03	0.15	0.00	0.15
API × Income	—	—	—	—	0.25	0.17	0.15	0.17	0.16	0.17
Education	—	—	—	—	—	—	-0.28***	0.10	-0.39****	0.10
Health problems	—	—	—	—	—	—	2.29****	0.30	2.46****	0.30
Marital status	—	—	—	—	—	—	—	—	0.92****	0.24
Age	—	—	—	—	—	—	—	—	-0.04****	0.01
Adjusted R^2										0.09

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$.

Black (1 = yes, 2 = no); Hispanic (1 = yes, 2 = no); API (1 = yes, 2 = no); gender (1 = women, 2 = men); health problems (1 = yes, 0 = no); marital status (1 = not married, 0 = married).

API: Asian/Pacific Islander; SE: standard error.

health problems exacerbates the Hispanic–white difference in distress (Model 4). Importantly, after including further adjustments for marital status and age, significant differences remain for both the average difference in distress between racial groups and the race-by-income interaction

for both black and Hispanic men (Model 5). Of note, income and education are not significant independent predictors of distress among men.

Nested results for women. Among women (Table IV), Model 1 shows Hispanics reporting

higher adjusted mean levels of psychological distress than whites. This effect is reduced to non-significance with the addition of income and household size and does not re-emerge as it did among men. Effects among black women are not significant. With the addition of the race-by-income interaction, API women report significantly lower levels of distress than white women (Model 3). This is the only indication of a significant difference in distress levels between APIs and whites. No significant differences between APIs and whites were found in either the full sample or among men. Among women, there were no statistically significant differences in distress levels between racial groups in the fully adjusted model.

All interaction analyses described above were examined using the global test of interaction (i.e. multiplicative term in the regression model). In order to more fully examine these interactions, we examined the income–distress relationship within the eight race-gender subgroups (data not shown). In these analyses, we found a significant crossover effect among black women. Black women report lower levels of psychological distress than white women at low income levels and higher distress at higher income levels. This crossover may account for the lack of a significant race-by-income interaction among women using the global interaction test. Black men report higher levels of distress than white men at the low and high extremes of the income gradient, with significant differences observed at higher income levels only. Results for Hispanics show Hispanic men reporting higher distress than white men at lower income levels and lower distress at higher income levels. Only effects at higher income levels are statistically significant. Hispanic women report higher distress levels across the income gradient, though differences at the extremes of the income gradient are not significant. No other significant differences in distress were found.

Discussion

We examined a cross-sectional multiracial/ethnic sample of adults in US households to assess the intersection of race, income and gender in predicting nonspecific psychological distress. Our primary study aim was to examine differences between additive and multiplicative models in modeling risk for psychological distress between racial/ethnic groups in the United States. We hypothesized that additive models do not sufficiently

account for potential interactions of race with income and gender, and may therefore mask important differences in distress between racial groups. The results suggest that our hypotheses were supported. First, after adjusting for income in the additive model, there were no statistically significant differences in distress levels between racial groups. This finding is common to studies using additive models to examine racial differences in distress adjusting for income or education (Kessler, 1979; Mirowsky & Ross, 1980; Neighbors, 1984; Williams et al., 1997). However, when the race-by-income interaction term was added to the model, significant racial differences in distress were observed. We found that racial differences in psychological distress varied by income-level, and demonstrate a path toward convergence as income increases with blacks reporting higher levels of distress compared with whites. We found five previous studies examining the interaction of race with income in predicting risk for non-specific psychological distress among adults in the United States (Bratter & Eschbach, 2005; Cockerham, 1990; Kessler & Neighbors, 1986; McVeigh et al., 2006; Ulbrich et al., 1989). Three of these studies showed a significant race-by-income interaction (Cockerham, 1990; Kessler & Neighbors, 1986; Ulbrich et al., 1989). These three studies examined black–white differences in distress. Two corroborate our findings that blacks have higher distress levels than whites and that compared with whites, blacks experience a greater decline in distress with increasing income (Kessler & Neighbors 1986; Ulbrich et al., 1989). Of the two studies not showing significant race-by-income interactions, only one used a national sample (Bratter & Eschbach, 2005). However, this study used a measure of distress designed to capture those most likely have a diagnosable mental illness (Kessler et al., 2002) and may, therefore, underestimate the degree of psychological distress in the population.

We found no studies that have examined the interaction of race with both income and gender in predicting psychological distress. By examining this three-way interaction, important differences in distress by race were observed that otherwise would not have been found. The finding of a significant crossover effect among black women is of particular salience because it is inconsistent with much of the previous literature showing either no black–white differences in distress or lower distress levels among blacks compared with whites. One potential explanation for the greater distress

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levels among white women at lower income-levels is status-inconsistency, 'the degree to which an individual's rank or position on important societal status hierarchies are at a comparable level' (Jackson, 1962). Jackson's seminal study (1962) of status inconsistency and psychological stress showed that inconsistent persons characterized by low achieved status and high attributed status report significantly higher levels of psychosocial stress compared with status-consistent groups. In particular, he shows higher symptom levels for groups whose racial/ethnic rank is superior to their social class rank. Previous studies also show that compared with men, women tend to have lower incomes for their occupational grade; and that these inconsistencies are related to disease outcomes (Peter, Gassler, & Geyer, 2007). Also consistent with our findings, Jackson further suggests that inconsistent groups characterized by high achieved status and low attributed status (e.g. high-income black women) will have fewer symptoms than those of opposite inconsistency (e.g. low-income white women), but will still have more symptoms than consistent groups (e.g. high-income white women). This hypothesis may also help explain the higher distress levels reported by black men at higher income levels. Findings among Hispanic men are not consistent with the status inconsistency hypothesis, but may reflect important factors such as various forms of social support and stress-coping style that, in spite of the discrimination this group experiences, have paradoxically been shown to improve their outcomes (Farley, Galves, Dickinson, & Perez Mde, 2005; Markides & Coreil, 1986). Another possibility is that different racial/ethnic/cultural groups may manifest distress differently (e.g. substance use, violent behaviour, suppressed emotion) (Aneshensel, 2002; Markides & Coreil, 1986) potentially resulting in biased distress estimates. This remains an empirical question.

Though one might assert, given these findings, that it is not race per se that predicts psychological distress but rather income and gender, we assert that the effect of race can not be properly examined without simultaneously considering both income and gender. As Belgrave, Wykle and Choi (1993) describe, '*...adding [emphasis added] these additional variables... appears to complicate and cloud independent main effects due to the indirect relationships and hidden confounders that exist among these variables...'*. Our data support this assertion showing that not only is it imperative to consider the simultaneous

effects of race, income and gender, but doing so in a way that takes full account of their synergy is key. Most previous studies have used additive models to examine racial differences in psychological distress. These studies are inconclusive. Some previous studies show that once income is adjusted no significant racial differences in psychological distress exist (Kessler, 1979; Williams et al., 1997). Other studies provide evidence of racial differences in distress with some showing advantages for whites and others showing advantages for blacks and/or Hispanics (Kessler, 1979; Neighbors, 1984; Pratt et al., 2007; Williams et al., 1997; Zahran et al., 2004). Few studies have explicitly modeled the interaction of race with income or gender.

Thus compared with previous studies, our study has several strengths that make it a significant contribution to the existing literature on racial differences in distress. As mentioned above, this is the first study to examine the three-way interaction of race with both income and gender in predicting risk for psychological distress among US adults. Secondly, this study uses a multiracial/ethnic sample where most previous studies have been restricted to black-white differences. Thirdly, we expand on previous work by examining racial differences in distress using a nationally representative sample. Finally, we use a continuous non-specific measure of psychological distress which, as previously described, may better capture the range of psychological suffering in the population. In sum, our findings both replicate and extend the findings of previous studies examining the interaction of race with income in predicting psychological distress. Details of these studies in comparison with ours are provided in Table V.

The results of this study should be considered in light of the study's limitations. These data are from 1994. In comparison with 2000 Census population estimates, our sample has a slightly higher rate of employment, fewer married persons, more education and a slightly higher mean income (not shown). Similarly, compared with non-respondents, MHS respondents have higher levels of income, education and employment (Hall, 2000). This is likely because of the 60 per cent response rate. Although moderate, this response rate is considered adequate for telephone surveys (Keeter, Miller, Kohut, Groves, & Presser, 2000) and is not uncommon for several recurring national telephone surveys (CASRO, 1982). However, this may have resulted in more conservative levels of distress in the study sample than

Table V. Comparison of studies examining the interaction of race with income in predicting non-specific psychological distress.

Author and date	Data source	Study sample	Psychological distress measure	α	Predictors and covariates	Interactions tested	Analytic method	Study findings
Kessler and Neighbors, 1986	Pooled data from eight different epidemiologic surveys	Various: US ages 21+(3); New Haven, CT ages 21+; US ages 25–74 (2); Kansas City, MO ages 18+; Chicago, IL ages 18–65	Various measures assessing depression and non-specific somatization: General Well Being Scale, Hopkins Symptom Checklist, CESD, Gurin Scale, Zung Scale, Langner psychophysiological subscale, Study-Specific Scale.	Various	Race (0 = white, 1 = black) Income and education	(1) race × income (2) race × education	Ordinary least squares regression: (1) race + income + education, (2) race × income (3) race × education Analyses repeated in subgroups of: (1) young versus old, (2) men versus women, (3) urban versus rural, (4) married versus not married Ordinary least squares regression stratified by race and age: (1) race × each indicator of SES, (2) race × occupational status, (3) life events + covariates by race within SES category (low, mid)	Additive models (1) after controlling for socio-economic status (SES), effect of race on depression remains significant but less positive, (2) effect of race on somatization negative but not significant, Interaction results (1) blacks have higher distress levels than whites, (2) racial differences greater for low versus higher income persons for depression and somatization, (3) racial differences greater for more versus less educated persons for depressed mood Significant race × income interaction (1) psychological distress decreases with increasing income, (2) blacks report higher distress than whites at lower income levels, (3) effect of income on distress stronger for blacks compared with whites such that distress levels converge at higher income levels Significant race × occupational status interaction: (1) crossover effect with blacks having higher distress levels at lower occupational status and higher distress levels at higher occupational status.
Ulbrich, Warheit, and Zimmerman, 1989	1984 telephone probability sample of adults in north central Florida (in-person interview)	2098 black and white men and women ages 18+ (<i>n</i> = 450 black and 1,648 white)	Summary score of a 20-item psychophysiological stress index	0.80	Race (0 = black, 1 = white) SES (household income, education, occupational status), stressful life events, age, marital status	(1) race × income (2) race × education (3) race × occupation	Ordinary least squares regression stratified by race and age: (1) race × each indicator of SES, (2) race × occupational status, (3) life events + covariates by race within SES category (low, mid)	Significant race × income interaction (1) psychological distress decreases with increasing income, (2) blacks report higher distress than whites at lower income levels, (3) effect of income on distress stronger for blacks compared with whites such that distress levels converge at higher income levels Significant race × occupational status interaction: (1) crossover effect with blacks having higher distress levels at lower occupational status and higher distress levels at higher occupational status.

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Cockerham, 1990	1985 telephone probability sample of Illinois households (telephone interview)	804 black and white men and women ($n = 661$ white and 114 black) ages 18+	Eight psychological and psychosomatic items from the Langer index were summed and dichotomized into high scores (psychological distress) and low scores (psychological well-being)	0.74	Race (1 = black, 0 = white) SES (education, household income), age, employment status, marital status	(1) race \times income (2) race \times education	Nested multiple regression: (Step 1) race, (Step 2) age, gender, marital status, (Step 3) education, income, and employment status, (Step 4) black \times education, black \times income	<p><u>Additive models</u></p> <p>(1) Blacks report lower distress levels than whites. Effects not significant</p> <p><u>Significant race \times income interaction</u></p> <p>(1) blacks report lower distress levels than whites, (2) psychological distress decreases with increasing income, (3) effects stronger for blacks compared with whites.</p>
Bratter and Eschbach, 2005	1997–2001 pooled data from a national probability sample of the non-institutionalized adult US population (NHIS)	162,032 adult men and women from varying racial backgrounds.	K-6: 'During the past 30 days, how often did you feel (1) so sad nothing could cheer you up, (2) nervous, (3) restless or fidgety, (4) hopeless, (5) that everything was an effort, (6) worthless. Scale developed to maximize precision in the 90th–99th percentile range of clinical disorder	0.89	Race = white, black, Native American, Asian/Pacific Islander, Mexican, Puerto Rican, Cuban, other mixed, other SES (family income, education, employment), age, gender, acculturation (length of time in US, language use), marital status, self-reported chronic illness	(1) race \times gender (2) race \times income (3) race \times education (4) race \times employment	Nested multiple linear regression: (I) Nested regression of predictor variables: (Step 1) age, gender, (Step 2) race, (Step 3) acculturation, (Step 4) SES, (Step 5) marital status, (Step 6) chronic illness; (II) simultaneous estimation of race \times each set of covariates	<p><u>Additive models</u></p> <p>(1) after controlling for covariates, blacks, Asians, and Mexicans report lower distress than whites, with the biggest racial gap between blacks and whites, (2) Puerto Ricans and racially mixed persons report higher distress than whites.</p> <p><u>Race \times SES Interaction results</u></p> <p>(1) no significant race \times income interactions, (2) significant positive race \times employment interaction for Puerto Ricans, (3) significant race \times education interaction for Mexicans and Puerto Ricans only, (4) no significant race \times SES interactions for blacks or other Hispanics.</p>

Table V. Continued

Author and date	Data source	Study sample	Psychological distress measure	α	Predictors and covariates	Interactions tested	Analytic method	Study findings
Nuru-Jeter, Williams, and LaVeist, 2008	1994 Minority Health Survey: national probability sample of the non-institutionalized adult US population (telephone interview)	3,789 men and women ages 18+ of varying racial/ethnic background: white, black, Hispanic, Native American, Asian/Pacific Islander, other.	MHI-5: How often over the past month have you (1) been a happy person, (2) felt calm and peaceful, (3) been a nervous person, (4) felt downhearted and blue, (5) felt so down in the dumps nothing could cheer you up?	0.88	Race: white, black, Hispanic, Asian/Pacific Islander Income, gender, household size, education, employment status, age, marital status, health problems, negative life events	(1) race \times income (2) race \times gender (3) race \times income \times gender	Nested multiple linear regression: (I) (Step 1) race, (Step 2) income, household size, (Step 3) gender, (Step 4) race \times income, (Step 5) education, health problems, (Step 6) marital status, age (II) Nested multiple linear regression (same as above) by gender subgroup	Additive models (1) Blacks and Hispanics report higher distress than whites (unadjusted), (2) No significant effect of race on distress after controlling for income Interaction results (full sample) (1) significant race \times income interaction such that distress levels decline more with increasing income for blacks compared with whites. Interaction results (gender subgroups) Men: (1) blacks and Hispanics report higher adjusted mean levels of distress compared with whites, (2) significant race \times income interaction with distress levels decreasing more with increasing income among blacks and Hispanics than among whites. Women: (1) no significant racial differences in adjusted mean levels of distress, (2) no significant interaction effects.

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what might be observed among the general population. Consequently, our findings may underestimate the effect of race on distress at the lower end of the income gradient. Examining this issue in a sample with more low-income respondents may prove worthwhile in ascertaining a more complete understanding of effects at the lower end of the income gradient.

When examining racial differences in health, the common strategy is to control for income, gender and other factors expected to modify the effect of race. This study underscores the importance of using multiplicative models to more fully account for the interactive nature of race with these other variables. We demonstrate that not doing so prevents us from fully understanding how race operates and conceals its role in the creation and preservation of disparities; and offer this as an approach for examining racial health disparities more broadly.

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