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Light Privilege? Skin Tone Stratification in Health among African Americans

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Abstract

Skin tone is a significant marker used by others to evaluate and rank the social position of minorities. While skin color represents a particularly salient dimension of race, its consequences for health remains unclear. This study uses four waves of panel data from the Coronary Artery Risk Development in Young Adults (CARDIA) Study and random intercept multilevel models to address three research questions critical to understanding the skin color-health relationship among African American adults (N=1,680): what is the relationship between skin color and two global measures of health (cumulative biological risk and self-rated health)? To what extent are these relationships gendered? Do socioeconomic resources, stressors, and discrimination help explain the skin color-health relationship? Findings indicate that dark-skinned women have more physiological deterioration and self-report worse health than lighter-skinned women. These associations are not evident among men, and socioeconomic factors, stressors, and discrimination do not explain the light-dark disparity in physiological deterioration among women. Differences in self-ratings of health among women are partially explained by education and income. Results of this study highlight heterogeneity in determinants of health among African Americans, and provide a more nuanced understanding of health inequality by identifying particularly disadvantaged members of racial groups that are often assumed to have monolithic experiences.

Keywords

Colorism; Health Inequality; Stratification; Within-group Heterogeneity; African Americans

Racial health inequality in the United States (US) has received considerable attention in the social sciences. Compared to whites, African Americans are disadvantaged across an array of outcomes, including objective (i.e., physiological markers) and subjective (i.e., self-rated) measures of health (Brown et al. 2016; Cobb et al. 2016; Duru et al. 2012). Research also suggests that racial disparities in physical health are gendered, as black-white differences tend to be larger among women compared to men (Hargrove 2018; Warner and Brown 2011; Umberson et al. 2014). While the racial stratification of health is well documented, a majority of studies have been unable to completely explain the health gap between African Americans and whites, even when accounting for various socioeconomic and psychosocial

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factors (Brown et al. 2016; Sternthal, Slopen, and Williams 2011). The inability of previous studies to explain the health disadvantages of African Americans may be due to the untenable assumption that African Americans as a whole are impacted by social factors in an equivalent manner, and therefore experience similar patterns of health. This assumption masks potential intraracial heterogeneity in health, as well as health-relevant risks or resources that may be unique to this group.

One line of research to address this limitation involves examining the health consequences of skin tone among African Americans. Skin color represents a salient dimension of race that has received less attention in health disparities research than other indicators of race, such as self-identification (Roth 2016).[1] Those of lighter skin are awarded social and economic privileges because of their closer phenotypic resemblance to whites and their assumed superior social value relative to their darker-skinned counterparts (Dixon and Telles 2017; Hunter 2007). While research has documented skin color stratification in various aspects of life, particularly socioeconomic status (Thompson and Keith 2001; Monk 2014), less is known about the significance of skin color for one of the most crucial determinants of life chances: health. Past research has tended to focus on a single outcome (namely blood pressure), rely on cross-sectional data, and has not tested potential mechanisms other than socioeconomic status (SES) that may underlie the skin color-health relationship. Missing from the literature are therefore recent and systematic investigations of the relationship between skin tone and health, broadly assessed (for an exception, see Monk 2015). This is a particularly pressing topic for social scientists given that recent population trends (e.g., increases in nonwhite immigration, interracial unions) are shifting the racial structure in the US, and potentially placing greater emphasis on skin color as a marker of stratification and determinant of life chances (Bonilla-Silva and Dietrich 2010). While skin complexion has always been consequential among African Americans, changes in the social hierarchy hold significant implications for future health profiles of this group as well as the nature of intra- and inter-racial inequality.

Furthermore, insufficient attention has been given to how skin color may intersect with other key systems of stratification to shape health, particularly gender. Health disparities research tends to treat systems of inequality (and their consequences) as independent of one another, resulting in approaches that either examine marginalized statuses individually or assume that the poor health of multiply disadvantaged individuals is due to the sum of the health risks associated with each status. While informative, these types of approaches mask the positions of power and disadvantage within which individuals are simultaneously situated (Collins 2015; Lopez and Gadsden 2016). Studies relying on independent or additive approaches may over- or underestimate health inequalities or overlook groups that are most at risk.

Efforts to reduce health inequalities require increased knowledge of the unique pathways to health among diverse social groups. To aid in this effort, the present study addresses three research questions critical to understanding the skin color-health relationship among African Americans: what is the relationship between skin color and global indicators of health

[1]·Informed by social constructionist perspectives, this study considers race to be a socially constructed, multidimensional concept that embodies past and present social, political, economic, and ideological domination (Bonilla-Silva 2015).

among African American adults? To what extent are these relationships gendered? Do socioeconomic resources, stressors, and discrimination help explain the skin color-health relationship? I examine differences in cumulative biological risk and self-rated health among African American men and women aged 32–55 using the Coronary Artery Risk Development in Young Adults (CARDIA) Study. Findings will offer critical insight into the pathways linking skin color to poor health throughout adulthood.

BACKGROUND

Colorism in the US

Research has long found that the hue of one's skin significantly structures access to opportunities and desired resources among African Americans (Drake and Cayton 1945; Monk 2014). Originating from slavery and European colonialism, colorism is a dimension of stratification that derives from racism. It is inextricably linked to hegemonic beliefs in the social superiority of whites over all other racial groups (Hunter 2007). Colorism therefore constitutes an ideological and structural system of inequality that affords special advantages to lighter-skinned individuals because of their closer phenotypic resemblance and presumed genetic similarity to Europeans and, therefore, to Eurocentric standards of beauty, morality, intellect, and status (Dixon and Telles 2017; Russell, Wilson, and Hall 1992). While skin color represents a salient dimension of race, the processes through which it shapes health and well-being among African Americans is both related to and distinct from those of race (Hunter 2007). That is, the experience, nature, and consequences of institutional racism and interpersonal discrimination differ among those of lighter- vs. darker-skin. For example, scholarship has consistently found that despite access to fewer social and economic resources among all African Americans compared to whites, lighter-skinned blacks are more advantaged than their darker-skinned counterparts in the labor market (Monk 2014; Wade, Romano, and Blue 2004), criminal justice system (White 2015), perceived personal attributes such as attractiveness, intelligence, and morality (Adams, Kurtz-Costes, and Hoffman 2016; Maddox and Gray 2002), and, to a lesser extent, discrimination (Monk 2015; Uzogara et al. 2014). At times, the magnitude of skin tone inequalities among African Americans is similar to the magnitude of white-black disparities (Goldsmith, Hamilton, and Darity 2007). These findings suggest the existence of "light (skin) privilege" in which individuals and social institutions unequally afford opportunities and assign social power to minorities according to indicators of status (e.g., skin tone) other than assumed race (Hill 2002a; Hughes and Hertel 1990). Skin tone therefore represents an entrenched status characteristic both related to, and distinct from, race.

Prior research also highlights the gendered nature of colorism. Scholars have noted that skin complexion is more consequential for black women's lives than black men's (Dixon and Telles 2017; Hill 2002a; Monk 2014). Intersectionality theory provides a lens through which we can understand how light skin affords special advantages and opportunities to African American women in ways that it does not for men. Specifically, intersectionality posits that social inequalities are simultaneous and interdependent—combining in multiplicative rather than additive ways to mutually construct one another and structure unique social contexts that frame lived experiences and life chances (Collins 2015). Individuals situated at similar

locations in the social structure therefore have shared, yet distinct social realities (Lopez and Gadsden 2016). Indeed, scholars have noted that, as a result of its intersection with sexism, forms and consequences of colorism vary by gender (Hill 2002a). For example, physical appearance and attractiveness are critical components of socioeconomic success for women of all races living in a patriarchal society (Anderson et al. 2010; Hamermesh 2013). Beauty can be a substitute for, or considered equivalent to, ability and characteristics employed by men (e.g., intelligence, political influence) to increase their life chances (Fletcher 2009; Lakoff and Scherr 1984; Wolf 1991). As a result, beauty—defined in the US by fairer skin and other indicators of European features—is a form of capital for women (Hunter 2007). For African American women in particular, light skin acts an additional form of capital that can be used to accumulate more social and economic resources compared to darker-skinned women and black men (Hunter 2007; Monk 2014).

Similarly, skin tone may be more consequential for women than men because of its role in mate selection (Dixon and Telles 2017; Drake and Cayton 1957). Marriage is one mechanism through which socioeconomic position may be enhanced, particularly for women (Dixon 2009). Black women with lighter skin are more likely to marry men of greater social and economic status because of their perceived attractiveness and presumed characteristics regarding femininity and morality (Keith and Herring 1991; Hamilton, Goldsmith, and Darity 2009). Upward mobility via marriage to high status men may constitute a particularly relevant factor for African American women's health compared to their male counterparts, as these women experience disproportionately high rates of socioeconomic disadvantage that translate into few resources (e.g., income, wealth, power) for promoting health (Brown 2016; Chang and Lui 2010). Therefore, the advantage lighter-skinned women have in marriage can increase their access to socioeconomic resources that not only improve healthy living and reduce exposure to health risks, but also lessen the potentially negative impacts of the absence of other health promoting resources (e.g., Ross and Mirowsky 2006). Taken together, the intersections of race, skin color, and gender may differentially shape the role of skin tone in structuring health among African American men and women.

The Relationship between Skin Tone and Health

While prior work documents the continued existence of skin tone stratification among African Americans, one area that has been particularly understudied is the relationship between skin tone and physical health. Given that, similar to racism and sexism, colorism structures access to opportunities, resources, and exposures to risks (Dixon and Telles 2017; Monk 2014), skin color likely constitutes a significant determinant of health. Extant research, however, provides modest evidence of an association between skin tone and physical well-being among African Americans. Overwhelmingly, previous studies have focused on a single outcome, finding that dark skin is associated with increased risk for high blood pressure and hypertension among African Americans (Boyle 1970; Harburg et al. 1978). These associations are, at times, explained by socioeconomic status (Keil et al. 1981; Keil et al. 1977) or are only significant among those of lower SES (Klag et al. 1991).

More recent research, however, has produced mixed results. For example, of two studies using data from the CARDIA study, one finds no significant association between skin color and self-rated physical health among African Americans (Borrell et al. 2006), while the other documents a significant skin color gradient in systolic blood pressure (Sweet et al. 2007). Results from the latter study also suggest a *negative* association between income and systolic blood pressure among lighter-skinned African Americans, yet a *positive* association among dark-skinned African Americans. Furthermore, Monk (2015) finds that African Americans who self-report having darker skin have significantly higher odds of hypertension compared to their light-skinned counterparts in the National Survey of American Life. This relationship remains significant when accounting for several sociodemographic factors and experiences of racial and skin color discrimination. Similarly, Cobb and colleagues (2016) report a skin color gradient in markers of physiological functioning among African American adults living in Nashville, TN that is not explained by socioeconomic resources.

While recent scholarship provides critical insight into the physical health consequences of skin color among African American adults, several limitations should be addressed to advance this literature. First, prior work has tended to focus on specific indicators of physical health, leaving unclear how skin tone might shape broader indicators of health and well-being. General measures of health should be examined for several reasons. Importantly, focusing on specific disorders or conditions not only limits our understanding of the broad health consequences of the social world, but also potentially misclassifies individuals as healthy when they are actually sick or at risk of becoming unhealthy according to another indicator of health (Aneshensel 2005). The magnitude of health inequality between social groups may therefore be underestimated when basing such conclusions on studies that examine singular health outcomes.

Second, current research tends to aggregate the entire African American sample. This precludes an investigation of the extent to which associations between skin tone and physical health might be shaped by gender. Prior work suggests that race and gender combine in ways that produce alternating disadvantages in health within the African American population. Black women, for example, tend to have worse functional health, are at increased risk for several chronic illnesses, and experience higher risk of accelerated physiological aging compared to black men (Brown and Hargrove 2013; Erving 2011; Geronimus et al. 2006; Hargrove 2017; Monk 2015). Black men, however, have consistently higher mortality rates and lower life expectancies than black women (NCHS 2017; Xu et al. 2016). These patterns are generally attributed to the unique stressors and lived experiences characteristic of black women and men. Such experiences are structured, in part, by behaviors and expectations stemming from racialized notions of masculinity and femininity (Courtenay 2000; Goff, Thomas, and Jackson 2008; Griffith 2012). Less understood, however, is how gender might differentiate the health consequences of skin color among African American men and women. Given the unequal distribution of health risk and protective factors by skin tone, the consequences of race and gender may be further conditioned by skin tone. Such an empirical question will be addressed in the present study.

Third, prior work generally relies on cross-sectional data and analyses, leaving unclear whether and how skin color may impact health over time. Examining the consequences of

skin color over time will provide evidence of the extent to which intersecting social factors (such as skin color and gender) have prolonged versus acute consequences on physical well-being. Information from prior research will be augmented here by examining whether skin color differentially shapes average levels of health for African American men and women across an 11-year span. Fourth, few studies have conceptualized and empirically tested several mechanisms that may underlie the skin color-health relationship (see Monk 2015 for an exception). One likely mechanism is socioeconomic status. Previous studies have documented a robust relationship between SES and health in the US; those with more socioeconomic resources, including education and income, tend to have better health than their socioeconomically disadvantaged counterparts. This relationship is attributed to greater access to health promoting resources, knowledge, and power, and decreased exposure to health risks among the socioeconomically advantaged (Phelan and Link 2015). Studies have also consistently shown that those of lighter skin shades have higher levels of education, income, and occupational prestige, and have partners of higher SES compared to their darker-skinned counterparts (Keith and Herring 1991; Monk 2014). Given the plethora of research supporting the notion that interracial differences in SES contribute to racial inequality in health, it is likely that these intraracial variations in SES among African Americans will help explain skin tone disparities in health. Specifically, African Americans with lighter skin may experience better health than those with darker skin as a consequence of their position in the socioeconomic hierarchy and subsequent ability to access health-relevant resources and knowledge.

A second mechanism through which skin tone may shape health among African Americans is exposure to chronic and discrimination stressors. An abundance of prior research links social stressors to poor health via multiple pathways, including advanced deterioration of multiple physiological systems, induction of negative emotional states, unhealthy coping behaviors, and lack of adherence to medical regimens (Seeman et al. 2008; Williams and Mohammed 2009). Institutional and interpersonal discrimination additionally affect health among African Americans by structuring access to opportunities, desired resources, and neighborhoods characterized by concentrated social and economic disadvantages (Gee and Ford 2011; Williams 2012). Exposure to stressors and discrimination may be differentially distributed among African Americans for several reasons. As a marker of social status, skin color has a major impact on the allocation of socioeconomic resources, with those of darker skin being particularly disadvantaged (Dixon and Telles 2017; Goldsmith et al. 2007; Monk 2014). Therefore, dark-skinned individuals, especially women, likely have fewer social, economic, and political resources to navigate life compared to their lighter-skinned counterparts, resulting in constrained choices for healthy living and increased exposure to stressors.

Furthermore, as a phenotypic attribute, skin color acts as a signal for presumed personal characteristics (e.g., race) and specific types of social interactions between social groups (Adams et al. 2016). In a racialized society such as the US, these presumed characteristics and attitudes toward others are not only a result of systems of oppression, but are also used to reinforce social structures and hierarchies by shaping practices, relations, and behaviors at all levels of society (Bonilla-Silva 2015). For example, pervasive social stereotypes associate dark brown skin with danger, incompetence, and unattractiveness (Hill 2002a; Maddox and

Gray 2002). Such stereotypes influence behavior automatically and unconsciously (Bargh, Chen, and Burrows 1996), leading to darker-skinned individuals experiencing worse treatment from society as a whole compared to light-skinned individuals—treatment that influences access to life chances. Indeed, modest evidence suggests that darker-skinned African Americans, primarily men, report more experiences of discrimination than their lighter-skinned counterparts (Hersch 2011; Monk 2015; Uzogara et al. 2014). Other studies, however, find no direct link between skin color and reports of discrimination (e.g., Borrell et al. 2006).

Overall, limited research has investigated the relationship between skin color and physical health. These studies have generally examined specific markers of health (e.g., blood pressure) at one point in time, produced mixed findings, overlooked how the health consequences of skin color may differ by gender, and have not evaluated the extent to which several factors may account for the skin color-health relationship. Addressing these gaps in the literature requires examining global indicators of health across a substantial time period as well as assessing the role of multiple factors that may underlie these associations. I therefore investigate the consequences of skin color on average levels of overall health across an 11-year span with three research questions: 1) what is the relationship between skin tone and cumulative biological risk and self-rated health among African American adults? 2) To what extent are these relationships gendered? 3) Do socioeconomic resources, stressors, and experiences of discrimination help explain the skin tone-health relationships?

DATA AND METHODS

Data

This study draws on four waves of panel data from the Coronary Artery Risk Development in Young Adults (CARDIA) Study. The CARDIA Study was designed to increase the understanding of risk factors for cardiovascular disease during the transition from young adulthood to middle age. It sampled black and white men and women aged 18–30 in four field centers between 1985 and 1986: The University of Alabama at Birmingham (Birmingham, AL), the University of Minnesota (Minneapolis, MN), Northwestern University (Chicago, IL), and Kaiser Permanente (Oakland, CA) (N=5,115). In Birmingham, Minneapolis, and Chicago participants were recruited by random-digit dialing from total communities or specific census tracts. In Oakland, participants were randomly selected from a membership roster of a health-care plan. In each research site, participants were selected so that there would be approximately equal numbers of individuals across gender, age, race, and education subgroups. Follow-up data were collected in 1987–1988 (Year 2), 1990–1991 (Year 5), 1992–1993 (Year 7), 1995–1996 (Year 10), 2000–2001 (Year 15), 2005–2006 (Year 20), and 2010–2011 (Year 25). Analyses are restricted to information from Years 7, 15, 20, and 25 among US born respondents who self-identify as African American or Black and are not missing on the skin color measure (N=1,680).[2] Skin tone is the only measure

[2]Supplemental analyses (available upon request) indicate no significant differences between black respondents who left the CARDIA Study and those who remained across several objective measures of health (blood pressure, HDL cholesterol, waist circumference, triglycerides, insulin) and physician diagnosed chronic conditions (high blood pressure, heart disease, high cholesterol, kidney disease, and nervous, emotional, or mental disorders). African American respondents who left the study, however, tended to have lighter skin, slightly less education, and were less likely to be married or employed at baseline.

taken from Year 7—all other variables utilize information from Years 15–25, when respondents are between the ages of 32 and 55. Response rates among the African American sample across Years 7, 15, 20, and 25 range from 62–75%.

Dependent Variables

This study considers two non-specific measures of physical well-being to assess the broad health consequences of colorism. For both outcomes, women who are pregnant at a particular observation are treated as missing. *Cumulative biological risk (CBR)* refers to a summary index of risk factors that reflect physiological dysregulation across multiple systems owing to cumulative and repeated exposure and adaptation to stressors. While such dysregulation is commonly known as "allostatic load", the biomarkers available in the CARDIA Study represent secondary outcomes (e.g., blood pressure, cholesterol) rather than primary stress mediators that directly represent the concept of allostatic load (e.g., epinephrine, norepinephrine, cortisol). These secondary outcomes may reflect physiological responses to exposures and adaptations to stress, or conversely, may be the result of another etiology. Therefore, similar to other recent studies (e.g., King et al. 2011), I use the term cumulative biological risk instead of allostatic load to more accurately describe what is being captured.

Ten biomarkers are used to construct the CBR index. Consistent with prior research, biomarkers are dichotomized based on clinical disease cut points and then summed (King et al. 2011; Seeman et al. 2008). Cutoff points for each biomarker are as follows[3]: systolic blood pressure (1=greater than or equal to 130mm Hg, or high blood pressure medication); diastolic blood pressure (1=greater than or equal to 85mm Hg, or high blood pressure medication); creatinine (1=greater than or equal to 1.2mg/dl in women; 1.5mg/dl in men); HDL cholesterol (1=less than or equal to 49mg/dL in women; 39 mg/dL in men); total cholesterol (1=greater than or equal to 240mg/dL, or cholesterol medication); triglycerides (1=greater than or equal to 150mg/dL); waist circumference (1=greater than 88cm in women; 120cm in men); CRP (1=greater than or equal to 3mg/L); fasting insulin (1=greater than or equal to 75th percentile of insulin distribution); and fasting glucose (1=greater than or equal to 100mg/dL, or diabetes medication).

Self-rated health is measured by respondents' answer to the question: "In general, would you say your health is: excellent, very good, good, fair, or poor?" Response categories range from 1 (excellent) to 5 (poor). Given small cell sizes, "fair" and "poor" categories are combined (range=1–4). This single, self-reported item is a reliable and valid measure of general health status. It predicts morbidity (Latham and Peek 2012) and mortality above and beyond known risk factors (Schnittker and Bacak 2014). Importantly, this measure represents an individual and subjective multidimensional conception of health that embodies social, psychological, and biological determinants of health and well-being (Jylhä 2009).

[3]Cutoff points reflect pre-diagnostic conditions (e.g., prehypertension, prediabetes) to capture risk for the development of chronic disorders. Findings are robust to alternative cutoff points.

Independent Variables

The main predictor of interest is skin tone. *Skin tone* is indexed by three dummy variables: light (yes=1), medium (yes=1), and dark (yes=1). It is measured in Year 7 of the CARDIA Study with amber, blue, and green filters of a Photovolt 577 reflectance meter that provides readings from the upper arm. Values of the readings indicate the percentage of light reflected from the arm, ranging from 0 to 100. Lower values indicate darker skin while higher values indicate lighter skin (range=7.1–51.2). Consistent with previous studies using these data, only amber reflectance readings are used given high collinearity between values of the amber, blue, and green filters, and values of these filter readings are categorized (Borrell et al. 2006; Sweet et al. 2007). The three skin tone categories are based on the 25^{th} and 75^{th} percentiles of the amber filter distribution among African Americans. Respondents with values greater than the 75^{th} percentile are considered “light”, respondents with values between the 25^{th} and 75^{th} percentiles are considered “medium”, and respondents with values lower than the 25^{th} percentile are considered “dark”. Light-skinned African Americans serve as the reference group. The categorization of the skin tone measure as well as these specific cut point are used in attempts to clearly discern independent skin tone groups and accurately capture how individuals may be viewed in the social world, particularly at the extreme ends of the skin color spectrum. Findings, however, are robust to alternative measures of skin color.

Education, income, marital status, and health insurance are used to examine the extent to which socioeconomic resources explain the relationship between skin tone and health. In an effort to utilize all available information from the CARDIA study, these measures are treated as time-varying covariates. *Education* is indexed by three dummy variables: whether the respondent has a high school education or less (yes=1; ref. group), has some college education (yes=1), and has a college education or more (yes=1). Respondents’ combined family *income* is assessed with an ordinal variable: 1=less than $5,000; 2=$5,000–11,999; 3=$12,000–15,999; 4=$16,000–24,999; 5=$25,000–34,999; 6=$35,000–49,999; 7=$50,000–74,999; 8=$75,000 or higher. Other socioeconomic resources include whether the respondent is *married* (1=yes), and whether the respondent has had *health insurance* for at least 18 months within the past two years (1=yes).

Stress and discrimination are additional explanatory variables of interest. In Years 15, 20, and 25, participants are asked about *chronic burdens* (lasting for more than 6 months) in four domains of life: health of close others, work, finances, and relationships. Response categories are recoded to 0 “no;” 1 “yes, but not very stressful;” 2 “yes, moderately stressful;” and 3 “yes, very stressful”, and averaged across the four domains. In Years 15 and 25, participants are also asked whether they have experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because of their race or color: at school, getting a job, getting housing, at work, at home, getting medical care, or on the street or in a public setting. If they answer yes, respondents are subsequently asked how often they experienced these treatments: 1 “rarely;” 2 “sometimes;” or 3 “often.” I average across these seven experiences to create a measure of *racial/color discrimination* (range=0–3). Since discrimination is not measured in Year 20, I impute values for this year based on skin color-gender specific values of discrimination in

Years 15 and 25. Supplemental analyses (not shown) indicate that results are robust to varying approaches to imputation. Stressors and discrimination are treated as time-varying covariates and are centered at their means for ease of interpretation.

All models control for *age*, measured in years and centered at age 32. Additionally, *taking medication* for a health issue (1=yes) is included in all self-rated health models. Medication use is not only a marker of poor health—of which those of marginalized social statuses (e.g., dark skin, women, those of lower SES) are more likely to suffer—but it represents a particular awareness of a health problem. Such recognition may be relevant when evaluating one's own health. Medication use not included in the CBR models given that such information is accounted for in the CBR measure.

Given theoretical arguments that the consequences of skin color are gendered, I stratify the models by *gender* (0=men; 1=women). Chow tests are used to assess whether the magnitude of coefficients for skin color, socioeconomic resources, stressors, and discrimination statistically differ for men and women. To minimize selection biases arising from *attrition due to dropout* across study waves, I control for the proportion of waves a respondent was not interviewed. This method is consistent with other studies using panel data and similar analytic methods (e.g., Brown et al. 2016).

Analytic Strategy

This study uses random intercept multilevel models estimated within a mixed model framework. These models examine the relationship between skin color and mean levels of health over young adulthood and middle life. They are ideal for panel data because they adjust for non-independence of observations due to repeated measures of the same individual across multiple waves (Raudenbush and Byrk 2002). Given the sampling design of the CARDIA Study, responses may also correlate among clusters. For ease of interpretation, I use a linear specification for each outcome, though supplementary analyses suggest that results are robust to a Poisson specification for CBR and an ordinal specification for self-rated health (see online Appendix Tables 1 and 2, respectively). Both fixed effects of covariates and random effects for the intercept are included in the model. Estimating random effects for the intercept accounts for person-specific errors, which represent unobserved differences between individuals that are stable over time and not accounted for by the covariates. Among the random effects, repeated observations (Level 1) are nested within respondents (Level 2). A comparison of likelihood ratio tests (LRTs) indicates that including a quadratic term for age did not improve the overall fit for the CBR and self-rated health models. Therefore, only a linear term for age is considered.

Table 1 presents the means and proportions of all study variables by gender and skin tone at Year 15. Tables 2 and 3 present multilevel models that estimate the extent to which skin color, sociodemographic factors, stressors, and discrimination shape CBR and self-rated health, respectively, among African American men and women. I utilize a stepwise modeling approach wherein the proposed explanatory factors are considered individually in each model and collectively in the final model. Specifically, Model 1 of Tables 2 and 3 regresses the health measures onto skin color, net of control variables. Models 2, 3, and 4 add sociodemographic factors, stressors, and discrimination measures to Model 1,

respectively. Model 5 of each table includes all covariates. All analyses are performed in Stata 14.1 and multiple imputation is used to handle item missingness.

RESULTS

Results from Table 1 indicate that several of the study measures vary by skin color and gender among African Americans. For example, African American women tend to have a lower CBR score and self-report worse health than men. Gender differences are especially pronounced in HDL and total cholesterol, triglycerides, waist circumference, CRP, and insulin. Additionally, levels of education, health insurance, chronic burdens, and medication use tend to be higher among women, while levels of income and marriage are higher among men. There is also a skin color gradient in health and SES among women. Compared to those of light skin, dark-skinned women have a higher CBR score, are less likely to have a college education, have less income, and are more likely to be taking medications. Interestingly, light- and dark-skinned women report similar levels of chronic burdens and have similar rates of health insurance, both of which are higher than those of medium-skinned women. Among men, there is a similar skin color gradient in socioeconomic resources whereby dark-skinned men have lower levels of education and income than light-skinned men.

Cumulative Biological Risk

Results from Model 1 of Table 2 suggest that there are significant skin color variations in CBR among African American women. Compared to women with light skin, medium- and dark-skinned women have higher average CBR scores across adulthood. For example, among women aged 45, those measured as having light skin can expect to have an a predicted CBR score of 2.55, while those measure as having medium or dark brown skin have a predicted CBR score of 2.87 and 3.49, respectively. Ancillary analyses (available upon request) suggest that no one biomarker is driving the results among women or men.

Model 2 adds socioeconomic factors to Model 1. Results suggest that education and marital status are associated with CBR scores among women, and explain a small portion of the skin color disparity. No other socioeconomic resources account for skin color differences among women, while only marital status and insurance have a direct, positive relationship with CBR among men. Results from Models 3 and 4 suggest that neither chronic burdens nor racial/color discrimination explain the skin color disparity among women. Additionally, these stressors do not have a direct effect on CBR for women or men. When considered collectively (Model 5), education and marital status continue to impact CBR differences among women and account for a small portion of the skin color disparity, while being married and having health insurance are positively associated with CBR among men. In each model, the coefficients for medium and dark skin complexion among women remains significant, indicating that socioeconomic resources, stressors, and discrimination do not explain skin tone differences in physiological markers of health. However, the unequal distribution of education and marital status among women explains about 11% of the light-medium disparity in CBR and 6% of the light-dark disparity. Furthermore, the significant Chow test for the intercept and skin color coefficients in Model 5 indicate that dark-skinned

women have the highest CBR of all skin color-gender groups, followed by medium-skinned women and light-skinned women. Lastly, the significant Chow test for age across all models suggests that CBR increases with age at a faster rate for African American women than men.

Self-Rated Health

Table 3 displays results from multilevel models examining the associations among skin color, socioeconomic resources, stressors, discrimination, and self-rated health. Model 1 of Table 3 indicates that dark-skinned women tend to report worse health than light-skinned women. Among average aged women, for example, those of light skin complexion have a predicted health rating of 2.64 while those of dark skin complexion have a predicted rating of 2.81. There are no initial skin color differences in self-ratings of health among men. Model 2 of Table 3 suggests that higher levels of education and income are related to better self-ratings of health for both women and men. Additionally, the dark skin color coefficient among women in Model 2 is reduced in magnitude and to non-statistical significance at the .05 alpha level, suggesting that skin color differences in education and income explain the light-dark gap in self-rated health.

Models 3 and 4 suggest that chronic burdens and discrimination each similarly predict worse self-reports of health among women and men. The coefficient for dark skin among women reduces in magnitude, but remains statistically significant in these models, indicating that chronic burdens and discrimination slightly contribute to the self-rated health disadvantage among dark-skinned women. When considered collectively (Model 5), education, income, chronic burdens, and discrimination continue to influence self-rated health among women and reduce the coefficient for dark skin in magnitude. However, the light-dark disparity among women remains significant. Among men, the associations among education, income, chronic burdens, discrimination, and self-rated health remain significant.

DISCUSSION

Racial inequalities in physical health remain a significant issue in the US, as black-white differences in health have not abated and are not explained entirely by socioeconomic and psychosocial factors (Brown et al. 2016; Sternthal et al. 2011; Hargrove 2018). Examining intragroup heterogeneity in health among African Americans may provide critical insight into the pathways leading to disparate rates of poor health among African Americans. Specifically, within-group approaches identify factors that distinguish pathways to health among those similarly positioned in the social structure. These types of approaches highlight the possibility of variations in the impact of social mechanisms on health among racial groups (Whitfield et al. 2008), as well as the influence of other social statuses on the experience and consequences of race (Collins 2015).

An important source of intragroup heterogeneity among African Americans is skin tone. Skin color represents a salient dimension of race that has distinct influences on life chances among African Americans above and beyond the impacts of traditionally measured race (Goldsmith et al. 2007; Wade et al. 2004). To date, however, few studies have systematically investigated the relationship between skin tone and physical health among African Americans, particularly how these relationships may be gendered and influenced by social

mechanisms other than SES (for an exception, see Monk 2015). The present study addresses these gaps and contributes to our understanding of skin color and health in several important ways.

First, this study is among the first to examine skin tone stratification across two global measures of health. The health measures considered here go beyond what has typically been studied in past research (e.g., blood pressure/hypertension), and highlight the cumulative and simultaneous consequences of several systems of inequality. Findings suggest that skin color is a significant predictor of cumulative biological risk (CBR) and self-rated health among African American women only. Medium- and dark-skinned women tend to experience more physiological deterioration than their light-skinned counterparts, while dark-skin women also self-report worse health. Medium-skinned women, however, self-report similar levels of health as women with light skin. Given that CBR and self-rated health represent multiple aspects of overall health, the results suggest that skin color exerts a broad impact on the physical well-being of African American women across early adulthood and mid-life.

Results from this study provide evidence that the association between skin color and physical health is gendered. These findings are consistent with prior literature indicating that skin color is particularly salient in the lives of African American women (Hunter 2007; Keith and Herring 1991). The health disadvantages of women with dark skin found here, as well as the lack of significant influence of skin color for men's health, may be a result of the intersecting consequences of colorism and sexism. For example, scholars have noted the particular importance of beauty for the life chances of all women in patriarchal societies (Hamermesh 2013). The hegemonic and Eurocentric social construction of beauty, which tends to privilege white, middle-class women (Jeffreys 2014), teaches girls from an early age that their bodies will be evaluated based on their appearances and that beauty is an attribute that must be pursued by women (Franzoi 1995). In turn, aesthetics confer social, economic, and political advantages and resources for women deemed socially attractive in the ways that other characteristics (e.g., intelligence) afford these advantages and resources to men (Anderson et al. 2010; Fletcher 2009).

For African American women specifically, light skin—which is a Eurocentric characteristic of beauty—embodies a form of capital that can be translated into health-relevant resources (Hamilton et al. 2009; Hunter 2007). African American men and darker-skinned women do not have access to this type of capital. Indeed, results from both prior literature and this study suggest that skin color is significantly associated with several determinants of health among African American women only, including education, occupational status, family income, high status marriages, self-esteem, and chronic burdens (Hunter 2005; Keith and Herring 1991; Thompson and Keith 2001). Taken together, these findings suggest that light skin structures access to resources and exposures to health risks that shape broad indicators of physical well-being among black women in ways that it does not for black men.

Second, this study extends previous research by examining several factors that may underlie skin color disparities in health. The majority of past research has tended to focus on socioeconomic explanations for the association between skin color and health. The present study, however, examines the role of chronic burdens and racial/color discrimination in

addition to socioeconomic resources in generating skin color differences in health. The findings indicate that the proposed mechanisms do little to account for skin color inequalities in CBR among women, while stress and discrimination do not directly shape physiological functioning among women and men. The lack of a significant impact of stress and discrimination on CBR is surprising given that this health outcome reflects physiological responses to stress. However, extant studies have similarly found that reports of perceived racial discrimination, in particular, are not directly related to physiological markers of health among African Americans (Chae et al. 2010; Fuller-Rowell, Doan, and Eccles 2012; Roberts et al. 2008). While scholars propose various explanations for these non-significant relationships (e.g., internalized racism; acknowledgement of discrimination as a protective mechanism), future research is needed to test such hypotheses and others as they relate to relationships among stressors, discrimination, and health.

Another explanation for the inability of discrimination to influence CBR might be the construction of the discrimination measure. The current measure averages across multiple sites of discrimination, implicitly assuming that each discriminatory event is equally consequential for health. Recent research, however, suggests that African Americans of varying skin shades are exposed to not only different amounts of discriminatory experiences, but also different types (Keith et al. 2017). It may be the case that the approach used in the present study to capture discrimination is obscuring unique patterns and domains where skin tone might be more germane. While examining this possibility is beyond the scope of this study, future work should consider how specific types of discrimination might differentially shape health among African Americans of different skin tones.

For self-rated health, several of the proposed explanatory factors helped reduce the light-dark disparity among women in both magnitude and statistical significance, particularly socioeconomic resources. Education and income, for example, accounted for the impact of skin color on self-ratings of health among women when considered independently from chronic burdens and discrimination. These findings indicate that disparities in self-rated health are generally accounted for by the economic disadvantage of dark-skinned women. It is therefore likely that the increased access to education and income affords light-skinned women the intrinsic and instrumental resources to promote health knowledge and behaviors, reduce exposure to health risks, and possibly ameliorate the consequences of disease after its onset (Herd et al. 2007; Phelan and Link 2015).

Overall, findings of this study indicate that while socioeconomic factors explain part of the light-dark difference in subjective ratings of health, chronic burdens and perceived discrimination do little to account for the health disadvantages of darker-skinned African American women compared to their light-skinned counterparts. The limited utility of the proposed factors to explain skin color differences in CBR suggest a need to evaluate whether other structural and psychosocial factors mediate the skin tone-health relationship. One potential line of inquiry involves examining experiences of unfair treatment based on one’s skin color. Indeed, while prior work generally indicates that darker-skinned African Americans report more experiences with discrimination as a result of negative stereotypes (Hersch 2011; Maddox and Gray 2002), additional scholarship suggests that those of light skin may experience considerable unfair treatment from other African Americans because

they are less readily perceived as members of the black community (Cunningham 1997; Uzogara and Jackson 2016; Veenstra 2011). Social cues and treatments by others that do not confirm personal identities and act to exclude individuals from the communities with which they identify can induce stress or jeopardize several determinants of health behaviors, such as self-esteem or other psychosocial resources (Campbell and Troyer 2007).

Recent work provides evidence for such a possibility, documenting that discrimination from other African Americans based on skin color is disproportionately experienced by those of dark- *and* light-skin complexion (Monk 2015; Uzogara et al. 2014; Uzogara and Jackson 2016). Skin color discrimination from varying sources is likely a crucial pathway linking skin tone to health. However, questions regarding unfair treatment in many datasets tend to confound or equate consequences stemming from race and color, limiting the ability to disentangle the influences of race and color on life chances. The data utilized in the present study, for example, do not capture social experiences and interactions attributable specifically to skin color, nor do they collect information on the race of the person committing the discriminatory act. Future data collection efforts should be geared toward obtaining more specific information on individuals' unique experiences with discrimination.

This study is not without limitations. First, while geographically diverse areas were sampled, these data are not nationally representative, and findings cannot be unequivocally applied to the broader US population. It is important to note, however, that not only did CARDIA participants tend to be better educated than their eligible nonparticipant counterparts, but prior analyses also indicated that the health statuses of CARDIA respondents at baseline were similar to those of white and black participants in national datasets collected around the same time (Friedman et al. 1988). Thus, it is unlikely that the findings here do not apply in any way to other African Americans in the US. The data may also be subject to potential selection bias given the disproportionate experience of socioeconomic disadvantage and incarceration among blacks compared to whites, and dark-skinned blacks compared to their lighter-skinned counterparts (Western and Pettit 2010; White 2015). However, this type of selection bias would likely produce conservative estimates of skin color disparities in physical health, as those who have the worst health (i.e., the socioeconomically disadvantaged) or are exposed to the most severe stressors (i.e., incarcerated populations)—both of whom are more likely to be darker in skin complexion—are likely not included in the CARDIA Study.

Second, this study is unable to examine whether skin color impacts health across diverse racial/ethnic groups, as only data on non-Hispanic white and black adults are available in the CARDIA Study. Similarly, due to data limitations, the extent to which the skin tone-health relationship varies by ethnicity and nativity among Black Americans remains unclear. Prior research documents a health disadvantage among US-born African Americans compared to their US- and foreign-born counterparts of African or West Indian ancestry (Jasso et al. 2004; Read and Emerson 2005). Given ethnic differences in historical and contemporary understandings of, and interactions with, racialized social structures (e.g., Read and Emerson 2005), it is likely that the health consequences of skin color vary by ethnicity and nativity. Furthermore, two important potential mediators (chronic burdens and discrimination) are measured only in Waves 6–8, truncating the age range of respondents to

32–55 years old. Thus, the extent to which skin color shapes health in earlier portions of adulthood requires additional studies.

Third, skin color in this study is measured objectively—as the percentage of light reflected off of the respondent's skin. This measurement of skin tone lacks the subjectivity and complexity that is characteristic of self-identification as well as of judgments made by others in society (Bargh et al 1996; Strack and Deutsch 2004). Indeed, recent work suggests that self- and socially-assigned skin color have distinct impacts on health and determinants of health among African Americans (Monk 2015). This is not surprising, as such measures represent different aspects of social categorization processes that occur at various levels of society. Interviewer-rated skin color, for example, might better capture the consequences of macro-level systems of power and domination that position individuals and groups in the social hierarchy (Bonilla-Silva 2015). Self-rated skin tone, however, represents individuals' assessment of their relative placement in the social structure that is influenced by their lived experiences. This type of self-identification is argued to be shaped by dynamic experiences and relationships with others, and to represent the culmination of interactions with the social world across the life course (Monk 2015). Given that different measures of skin color embody unique features of stratification processes, they likely have varying relationships with health. While other measures of skin color should be evaluated in the context of health inequality, objective measures of skin shade are still important, and at times preferable, indicators of color. These measurements, for example, allow for comparability across studies and populations, and reduce biases and use of non-relevant information inherent in interviewer ratings of skin color (Branigan et al. 2013; Hill 2002b).

Despite these limitations, the present study shows that skin color significantly influences the physical health of African American women. These findings augment prior studies that document skin tone biases and the gendered nature of colorism in the US. The within-group approach utilized here helps identify specific groups that may be overlooked in studies relying solely on between-group analyses. These groups may be key to helping explain health disparities between and within social groups that are often assumed to have monolithic experiences. Policies directed toward eradicating health inequality should be attentive to the differences in mechanisms underlying health among social groups, as these varied pathways may reflect the differential consequences of simultaneously experienced social statuses.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Means and Proportions of Study Variables at Baseline, by Gender and Skin Color

	Men				Women			
	Light	**Medium**	**Dark**	**Total**	**Light**	**Medium**	**Dark**	**Total**
Cumulative Biological Risk[a]	1.798	1.811	2.039	1.886	2.156	2.359 *	2.964 *†	2.412 *
Systolic Blood Pressure	.260	.275	.267	.269	.202	.265	.327 †	.258
Diastolic Blood Pressure	.298	.305	.325	.311	.243	.305	.333 †	.292
Creatinine	.010	.027	.059	.035	.027	.020	.069 †	.032
HDL Cholesterol	.324	.314	.307	.313	.373	.401 *	.457 *	.403 *
Total Cholesterol	.098	.098	.102	.100	.062	.059	.074	.063 *
Triglycerides	.245	.155 †	.210	.189	.073 *	.063 *	.062 *	.066 *
Waist Circumference	.038	.037	.078	.051	.421 *	.494 *	.657 *†	.503 *
C-reactive Protein	.260	.292	.292	.287	.445 *	.458 *	.541 *	.470 *
Glucose	.098	.119	.141	.123	.089	.082	.179 †	.102
Insulin	.198	.204	.270	.225	.257	.268 *	.329	.276 *
Self-Rated Health	2.442	2.397	2.510	2.443	2.573	2.573 *	2.652	2.588 *
Sociodemographic Factors								
High School or Less	.345	.397	.465 †	.411	.266	.299 *	.326 †	.294 *
Some College	.334	.385	.333 †	.358	.392	.434 *	.448 †	.423 *
College or More	.321	.218	.202 †	.231	.342	.267 *	.227 *†	.283 *
Income	6.264	6.002	5.623 †	5.919	5.931	5.609 *†	5.532 †	5.693 *
Married	.549	.566	.477	.532	.456	.461 *	.425	.423 *
Health Insurance	.875	.860	.836	.855	.929	.875 †	.897	.895 *
Chronic Burdens	.790	.749	.765	.762	.947	.827 †	.950 *	.887 *
Racial/Color Discrimination	.697	.626	.590	.626	.591	.579	.618	.590
Controls								
Age	40.163	39.418	39.646	39.663	39.985	39.748	39.500	39.772
Medication Use	.225	.216	.236	.225	.296	369 *†	424 *†	.357 *
Waves Missing (total)	.326	.286	.301	.299	.232 *	.205 *	.203 *	.213 *
N	146	383	277	806	333	552	202	1087

* $p < .05$ significant difference between men and women of same skin tone

† $p < .05$ significant difference among skin tones within gender (ref=light skin tone)

[a] Values of individual CBR biomarkers indicate proportion of group in high risk category according to clinical cutoff points

Table 2.

Multilevel Models of Skin Color, Sociodemographic Factors, Chronic Burdens, Discrimination, and Cumulative Biological Risk

	Model 1			Model 2			Model 3			Model 4			Model 5		
Fixed Effects[a]	**Men**	**Women**	[b] **m≠w**	**Men**	**Women**	**m≠w**	**Men**	**Women**	**m≠w**	**Men**	**Women**	**m≠w**	**Men**	**Women**	**m≠w**
Constant	1.321***	1.238***		.788**	1.576***	†	1.305***	1.224***		1.346***	1.263***		.774**	1.557***	†
Skin Color (ref., Light)															
Medium	−.198	.318*	†	−.188	.282*	†	−.192	.320*	†	−.208	.316*	†	−.193	.285*	†
Dark	.022	.937***	†	.070	.875***	†	.027	.937***	†	.010	.941***	†	.063	.882***	†
Sociodemographic Factors															
Some College				.083	.036								.087	.044	
College or More				.018	−.344**	†							.021	−.324**	
Income				.013	−.041								.015	−.039	
Married				.246*	.185*								.252**	.185*	
Insurance				.292**	−.077	†							.301**	−.081	†
Chronic Burdens							.060	.046					.090	.059	
Discrimination										−.095	−.159		−.141	−.150	
Age	.081***	.101***	†	.081***	.103***	†	.082***	.102***	†	.079***	.099***	†	.081***	.102***	†
Random Effects															
Level 1 Residual	1.127***	1.195***		1.122***	1.197***		1.127***	1.195***		1.127***	1.194***		1.121***	1.197***	
Level 2 Intercept	1.520***	1.694***		1.507***	1.664***		1.520***	1.691***		1.518***	1.691***		1.505***	1.660***	
N	696	984		696	984		696	984		696	984		696	984	

[a] All models control for proportion of waves missing

[b] 'm≠w' indicates Chow tests for differences between men and women

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$

† indicates a statistically significant (p<.05) difference in coefficients for men and women

Table 3.

Multilevel Models of Skin Color, Sociodemographic Factors, Chronic Burdens, Discrimination, and Self-Rated Health

	Model 1		Model 2		Model 3		Model 4		Model 5	
Fixed Effects[a,b]	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Constant	2.284***	2.285***	2.746***	2.774***	2.231***	2.253***	2.246***	2.300***	2.627***	2.662***
Skin Color (ref., Light)										
Medium	−.022	.071	−.065	.040	.003	.099	−.004	.089	−.033	.072
Dark	.015	.166*	−.091	.108	.024	.199**	.022	.198**	−.041	.143*
Sociodemographic Factors										
Some College			−.068	−.107**					−.079	−.124**
College or More			−.200**	−.271***					−.214**	−.297***
Income			−.058***	−047***					−.056***	−.037**
Married			.020	−.023					.026	−.031
Insurance			.005	−.060					.052	−.019
Chronic Burdens					.196***	.199***			.182***	.183***
Discrimination							.122**	.097**	.089*	.077*
Age	.013***	.017***	.013***	.017***	.027***	.027***	.025***	.025***	.028***	.029***
Random Effects										
Level 1 Residual	.578***	.559***	.577***	.562***	.584***	.559***	.583***	.559***	.583***	.561***
Level 2 Intercept	.654***	.590***	.634***	.551***	.667***	.591***	.684***	.617***	.646***	.557***
N	696	979	696	979	696	979	696	979	696	979

[a] All models control for proportion of waves missing

[b] Analyses indicate that Chow tests for differences between men and women are not significant

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$