The Color of Health: Skin Color, Ethnoracial Classification, and Discrimination in the Health of Latin Americans

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Abstract

Latin America is one of the most ethnoracially heterogeneous regions of the world. Despite this, health disparities research in Latin America tends to focus on gender, class and regional health differences while downplaying ethnoracial differences. Few scholars have conducted studies of ethnoracial identification and health disparities in Latin America. Research that examines multiple measures of ethnoracial identification is rarer still. Official data on race/ethnicity in Latin America are based on self-identification which can differ from interviewer-ascribed or phenotypic classification based on skin color. We use data from Brazil, Colombia, Mexico, and Peru to examine associations of interviewer-ascribed skin color, interviewer-ascribed race/ethnicity, and self-reported race/ethnicity with self-rated health among Latin American adults (ages 18-65). We also examine associations of observer-ascribed skin color with three additional correlates of health – skin color discrimination, class discrimination, and socio-economic status. We find a significant gradient in self-rated health by skin color. Those with darker skin colors report poorer health. Darker skin color influences self-rated health primarily by increasing exposure to class discrimination and low socio-economic status.

Keywords

Discrimination; race/ethnicity; socio-economic status (SES); skin color; self-rated health; Latino; Latin America

Introduction

Latin America is one of the most ethnoracially heterogenous regions of the world, comprised of nearly 500 million people, including about 40 million persons who self-identify as indigenous and about 120 million that self-identify as black or in categories

considered to be of African descent like *negro, mulato* and *pardo* (Telles & Bailey, 2013). Historically, national census data in Latin American countries have captured ethnoracial identifications inconsistently. But since 2000 most Latin American countries have collected these data (Telles & Flores, 2013) and begun to explore ethnoracial disparities in health (Casas, Dachs, & Bambas, 2001).

As a social and cultural construct, ethnoracial self-identifications are often quite fluid in Latin America (Telles & Flores, 2013; Wade, 1997). First, methods for collecting these data and estimating the size of indigenous and afro-descendent populations may change over time (Angosto & Kradolfer, 2012). Second, individuals' ethnoracial self-identifications can vary depending on their social status and social contexts, and can change over the life course (Schwartzman, 2007; Brown, Hitlin, & Elder, 2007). Third, one's self-reported ethnoracial identification may not correspond with ethnoracial classifications made by others (Saperstein, 2006; Veenstra, 2011).

In research on health disparities, the measurement of race/ethnicity is critical, with most studies using self-identifications based on predetermined categories. Self-reported race/ethnicity reflects personal associations with shared cultures and ways of life, an individual's assessment of their social status, and beliefs about how one is perceived by others, (Nagel, 1994; Telles and Flores 2013). However, they may also diverge from the ethnoracial categorizations made by others which underlie discrimination (Amaro & Zambrana, 2000; Klonoff & Landrine, 2000). Interviewer-ascribed race/ethnicity reflects ethnoracial categorizations by others which tend to be based more strongly on phenotypical markers such as skin tone, hair texture, and facial features. In comparison to self-reported race/ethnicity, observer-ascribed race/ethnicity may better capture differences in the ways individuals are perceived and treated by others, regardless of how they identify themselves (Bonilla-Silva, 1996; Jones et al., 2008). Actual skin color, when based on a color chart, is a relatively exogenous indicator of race/ethnicity since it is mostly unmediated by variables such as social status or social context. For this reason, public health and social science researchers interested in ethnoracial discrimination and its consequences have sometimes utilized measures of skin color as an alternative to measures of race/ethnicity based solely on self-identification or observer ascription (Klonoff & Landrine, 2000; Golash-Boza & Darity, 2008). These studies find strong associations between skin color and disparities in health, education, and economic well-being (e.g., Hersch, 2008; Hunter, 2007; Montalvo & Codina, 2001; Veenstra, 2011; Villarreal, 2010).

Though several studies have been conducted in the United States (e.g., Krieger, Sidney, and Coakley, 1998; Landale & Oropresa, 2005), research on health disparities in Latin America rarely examines ethnoracial difference by observer-ascribed classifications or skin color. Health disparities research in Latin America tends to focus on nationality as well as gender, class or SES, and regional health differences while downplaying ethnoracial differences (Biggs et al., 2010; Casas, Dachs, & Bambas, 2001; Zunzunegui et al., 2009). Additionally, research on ethnoracial health disparities in Latin America pertains primarily to Brazil, where there is a long tradition of capturing ethnoracial data in official statistics based on self-identification (Marteleto, 2012; Telles, 2004; Travassos et al., 2011).

In this article, we use survey data from the Project on Ethnicity and Race in Latin America (PERLA) to examine ethnoracial disparities in self-rated health in Brazil, Colombia, Mexico, and Peru. We first describe patterns in self-rated health by self-reported race/ethnicity, interviewer-ascribed race/ethnicity, and skin color within these countries. We then evaluate the association of skin color, a major observable component of race/ethnicity (Brown, Dane, & Durham, 1998), with health after controlling for self- and interviewer-ascribed race/ethnicity. Finally, we demonstrate the extent to which self-reported discrimination and socio-economic status (SES) may potentially mediate associations between skin color and self-rated health. Our analysis is guided by theories on the social determinants of health, which recognize that race/ethnicity can influence health through its influence on access to economic resources, psychosocial resources, and behavior (Marmot and Wilkinson, 2008; Krieger, 2000).

Our study focuses on self-rated health (SRH) because it is a widely recognized overall measure of individual health in population-based research and correlates strongly with morbidity and mortality throughout the world (Idler & Benyamini, 1997; Wong, Peláez, & Palloni, 2005). In Latin America, age-standardized rates of poor SRH among adults (18+) varies significantly across countries with lower rates of poor health in Mexico (36%) and higher rates of poor health in Brazil (49%) (Witvliet et al., 2012). Differences in demographics (e.g., gender and age) and socio-economic status (SES) across these countries explain only some of this variation (Dachs, et al., 2002; Witvliet et al., 2012; Wong, Peláez, Palloni, 2005). Differences in the availability of health care resources and differences across cultures in health values and expectations explain additional variation (Casas, Dachs, & Bambas, 2001; Deaton, 2007; Kandula, Lauderdale & Baker, 2007).

In the review of the literature below, we summarize the current literature on the relationships between race/ethnicity, discrimination, SES and health in Latin America. This study fills an important gap in the literature on health in Latin America. It is the first cross-national study to examine the association between skin color and health in Latin America, and to show how perceived class- and color-based discrimination and SES may potentially mediate the relationship between skin color and health.

Self-Reported Race/Ethnicity, Observer-Ascribed Race/Ethnicity, and Skin Color

Historically, race and ethnicity have been treated as distinct concepts in Latin America with race presumed to reflect phenotypical differences that do not change over a lifetime and ethnicity used to refer to culturally and linguistically distinct populations of Afro-descendants, indigenous peoples, and sometimes mixed-race persons (Telles & Bailey, 2013; UN-Habitat, 2003). "Whiteness" was often treated as self-evident and racial classifications were made by census enumerators (Loveman, 2009; Telles & Flores, 2013). In the 1930s, ideologies of *mestizaje*, or race mixing, aimed to foster national identities and prevent racial divisions. Thus, Latin American governments encouraged the adoption of mixed-race identities such as *mestizo* (mixed-white) and *mulato* (mixed-black) (Bost, 2003). More recently, the political mobilization of historically marginalized indigenous and Afro-descendent groups, in a turn towards multiculuturalism, have raised the value of indigenous and black identities and diminished the incentive to identify as white (Telles & Flores,

2013). As a result, the adoption of indigenous and Afro-descendent identities has begun to increase (Telles & Flores, 2013). Because of the fluidity of these ethnic and racial identifications and the tendency to use these terms synonymously, we have chosen to use the term ethnoracial as an adjective and then use race/ethnicity to refer to the social boundaries that people create based on skin color, other aspects of phenotype, culture, or language.

We also distinguish between self-reported race/ethnicity, interviewer-ascribed race/ethnicity, and skin color. Recent studies evaluating the congruence between self-reported race/ethnicity and interviewer-ascribed race/ethnicity in Latin America have found a high degree of incongruence between self-reported and interviewer-ascribed race/ethnicity in both Brazil and Peru (World Bank, 2003; Telles & Lim, 1998). Brazilians tended to self-identify as white more often than interviewers' categorized them as white ; Peruvians tended to report more mixed identities than the identities ascribed to them by their interviewers (World Bank, 2003). Similarly, associations between skin color and self-reported race/ethnicity show that individuals with a wide range of skin colors identify with each of the common ethnoracial categories in Latin America and individuals with the same skin color may choose to identify in distinct categories (Telles & Flores, 2013).

Most importantly, these incongruences or differences in categorization can result in meaningful differences in the measurement of ethnoracial health disparities (Amaro & Zambrana, 2000; Bratter & Gorman, 2011; Jones et al., 2008). Studies in Latin America, where the examination of ethnoracial health inequities have only recently begun, tend to be based on self-identification. In these studies, indigenous populations are often found to have the greatest risk of poor health outcomes (Casas, Dachs, & Bambas, 2001; Montegro & Stephens, 2006; PAHO, 1997). Of the two studies that we identified where skin color was measured, one found no association between skin color and SRH in Brazil (Travassos, et al., 2011). The other, conducted in Mexico, found a significant association between skin color and mental health (Ortiz-Hernandez et al., 2011). These differences in findings between Brazil and Mexico raise the possibility that associations of race/ethnicity or skin color with health may vary by both country and health outcome. This possibility is also consistent with previous research showing that white identities in Latin America, although constrained by skin color, are subject to social influences which vary by national context (Telles & Flores, 2013).

Color and Class Discrimination

Loosely defined as unfair or prejudicial treatment of different categories of individuals, discrimination can occur on the basis of a variety of characteristics (e.g., age, color, class, gender, religion, race/ethnicity, and sexuality) and manifests itself both through interpersonal behaviors and institutional designs which confer advantages on the dominant or preferred groups and constrain opportunities for the subordinante groups (Krieger, 2000). In this study, we focus on individuals' self-reports of discrimination based on their skin color or social class. Color-based discrimination occurs when individuals attribute differences in treatment to the color of their skin and can be a manifestation of preferences for whiteness in Latin America (Telles & Bailey, 2013). In contrast, class-based discrimination occurs when individuals attribute differences in treatment to poverty and low-levels of education.

Using self-reported measures of discrimination, previous studies of Latino and Black populations in the US have linked ethnoracial discrimination to a variety of poor health outcomes and suggest that ethnoracial health disparities may be partially attributable to the stress of discrimination (Braveman, Egerter, Williams, 2011; Klonoff & Landrine, 2000; Krieger, 2000; Paradies, 2006). Yet few scholars have conducted studies of self-reported discrimination (Macinko et al., 2012; Travassos et al., 2011) or its health consequences in Latin America (Faerstein et al., 2004; Ortiz-Hernandez, et al. 2011; Pavao et al., 2012; Santana et al. 2007). Moreover, these studies often fail to distinguish between discrimination based on color, class, gender, or other characteristics. Focused mostly on Brazil, these studies demonstrate that, compared to lighter-skinned persons and/or self-identified Whites, darker-skinned persons and/or self-identified Blacks report more discrimination and such discrimination is associated with higher rates of poor physical and mental health. Once discrimination is accounted for, direct associations between skin color or self-reported race/ethnicity and health diminish, suggesting that their influence on health is at least partially mediated through discrimination. In addition to potentially mediating the relationship between skin color or self-reported race/ethnicity and health, US-based studies also suggest the influence of discrimination on health may be modified by skin color or self-reported race/ethnicity (Byrd, 2012; Kessler 1979).

Socio-economic Status

The reduced attention to ethnoracial discrimination and disparities in health within Latin America may reflect *mestizaje* ideologies which stress sameness due to widespread ethnoracial mixture and embody long-held beliefs that socio-economic status rather than race/ethnicity structures inequalities (Wade, 1997; Telles, 2004). A multi-dimensional variable, SES typically reflects a combination of education, income or poverty, and occupational prestige (Oakes & Rossi, 2003). Throughout Latin America, several studies have found pronounced gradients in individual health by education, wealth, and occupational status (Casas, Dachs, & Bambas, 2001, Szwarcwald et al., 2005; Wong et al.; 2005; World Bank, 2003). Children and adults from lower SES households have higher rates of mortality and morbidity (Casas, Dachs, & Bambas, 2001). They also have less access to health services such as immunizations or prenatal care (Casas, Dachs, & Bambas, 2001).

Because educational attainment, wealth, and occupational status vary significantly by race/ethnicity within Latin American countries (Bastos et al., 2008; Casas, Dachs, & Bambas, 2001; Telles & Lim, 1998), it can be difficult to disentangle the effects of race/ethnicity on health from the effects of SES on health. Studies showing little or no association between race/ethnicity and health after controlling for SES suggest that the influence of race/ethnicity may be mediated through SES (Travassos et al. 2011; Ortiz-Hernandez et al., 2012) but, as discussed earlier, few studies of Latin America have evaluated this relationship with respect to ethnoracial differences in health. In addition, US-based studies suggest that the effects of SES on health may be modified by race/ethnicity. For example, Farmer and Ferraro (2005) provide evidence of a diminishing return to education for black adults. As education levels increase, blacks do not benefit from the same improvement in SRH as white adults. Yet, no studies of Latin America have evaluated this possibility.

Finally, the effects of SES on health may vary by country and urban location. Currently, income inequality in Latin America is higher than in any other region of the world including Asia, Europe, and Africa (World Bank, 2003). Among the Latin American countries we consider, Brazil and Colombia have the highest income inequality and Mexico and Peru have the lowest income inequality (UN-Habitat, 2012). In each of these countries, income inequality in urban areas is also greater than in rural areas (UN-Habitat, 2012). However, urban populations typically have greater access to health and other services such as water and sanitation services than rural populations (Casas, Dachs, & Bambas, 2001; Dachs et al., 2002; UN-Habitat, 2012).

Hypotheses

We hypothesize that lighter-skinned Latin Americans will have higher SRH than darker-skinned Latin Americans. Additionally, we hypothesize that both interviewer-ascribed and self-reported race/ethnicities potentially mediate the relationship between skin color and health. To the extent that skin color influences the likelihood of experiencing color- or class-based discrimination or having a lower socio-economic status, discrimination and SES may also mediate the relationship between skin color and health. Thus, after accounting for discrimination and SES, we hypothesize that the association between skin color and SRH will be diminished substantially. Additionally, we explore the potential for skin color and race/ethnicity to modify the relationships between discrimination and health as well as SES and health. We also explore the potential for each of these relationships (skin color, discrimination, and SES) to vary by country of residence or urban-rural location.

Methods

Study Design and Sample

We used data from the Project on Ethnicity and Race in Latin America (PERLA), a nationally-representative study of adults living in four Latin American countries—Brazil, Colombia, Mexico, and Peru (Telles, 2013). PERLA conducted nationally-representative random household surveys of Brazil, Colombia, Mexico, and Peru in 2010 with a focus on issues of race/ethnicity. These surveys employed a three stage sampling design that selected random municipalities in each country, then randomly selected blocks in each municipality and individuals within blocks on the basis of apportionments for age and sex.

All surveys were interviewer-administered in respondents' homes and in each country's primary language (i.e. Spanish or Portuguese). Interviewers were matched with respondents based on their country of residence and primary language. For 64% of interviewers, their self-reported skin color was also within one skin tone of respondents' skin color. Seventy-two percent of interviewers, compared with 24% of respondents, had some college education.

The full sample consists of 5,500 respondents from Brazil (N=1,000), Colombia (N=1,500), Mexico (N=1,500), and Peru (N=1,500). Limiting our analysis to adults ages 18-65 (N=5,125) and deleting observation with missing data on SRH (N=25) or our independent variables (N=179), we obtain an analytic sample of 4,921. On observable characteristics that

were not missing (e.g., age, gender, self-reported race/ethnicity, and education), we found no significant differences in means between those with missing data (N=204) and those with no missing data (N=4,921).

Measures

Our primary dependent variable is SRH and primary independent variable is skin color. We treat interviewer-ascribed or self-reported race/ethnicity as potential mediators. Other potentially mediating variables include color discrimination, class discrimination, years of education, and wealth. Controls for access to health insurance and several demographic variables which may confound associations with skin color are also measured.

Self-rated Health—We assessed self-rated health (SRH) with a single question, "In general, do you think your health is very good, good, fair, bad, or very bad?" This question has been well validated and utilized throughout the United States and Latin America (Idler & Benyamini, 1997; Wong, Peláez, & Palloni, 2005). Following common practice, we combined the top two categories (good-very good) and the bottom three categories (fair-very bad). This dichotomization enables the use of logistic regression. Moreover, results using this dichotomization have been found to lead to be similar to results generated by alternative statistical methods which incorporate the ordinal nature of SRH (Manor, Matthews, and Power, 2000).

Skin Color—Interviewers assessed the facial skin color for each respondent using an 11-point skin color palette. PERLA investigators designed the skin color palette using digital photographs of individuals. The palette was extensively pre-tested for interviewers' ease of use and representation of skin colors found in Latin America. To better account for the nonlinearities in associations of skin color with health, we re-coded skin color into 4 categories: very light (1-2), light (3-4), medium (5-6), and dark (7-11). Interviewer-rated skin color has been used in several surveys exploring racial discrimination and racial attitudes in the United States (Golash-Boza & Darity, 2008; Hersh, 2008) but, to our knowledge, have rarely been used in Latin America.

Interviewer-Ascribed and Self-Reported Race/Ethnicity—At the start of each survey, interviewers also reported their evaluations of each respondent's race/ethnicity – White (*Blanca/Branca*), Mixed-White (*Mestizo/Parda*), Indigenous (*Indigena*), Mixed-Black (*Mulato*), Black (*Negra/Preta*), or other. Later in the interview, respondents were asked to identify their race/ethnicity using these same categories and to indicate whether they belonged to a particular indigenous group in Peru or Mexico. After evaluating differences in the health and socio-economic characteristics of both interviewer-ascribed and self-reported *Mulatos* and Blacks, we found none and combined these two categories. Thus, based on these questions, we classified both interviewer-ascribed and self-reported race/ethnicity into 5 categories – White, *Mestizo*, Indigenous or Indigenous group, *Mulato* or Black, and other.

Self-reported race/ethnicity correlated highly with interviewer-ascribed race/ethnicity (r=.71). More specifically, interviewers' ethnoracial classifications of respondents matched

respondents' self-classifications in 61% of cases. Skin color also correlated with both interviewer-ascribed race/ethnicity (r=.64) and with self-reported race/ethnicity (r=.53). To review how ethnoracial identification and skin color are correlated see Telles and Flores (2013).

Indigenous Parent(s)—Respondents in all countries were also asked to indicate the ethnoracial background of each parent using the same categories as respondents' self-reported race/ethnicity. Based on their responses, we identified whether one or both of their parents was *indigena* (yes=1, no=0). Indigenous parentage is not synonymous with self-reporting *indigena* as one's race/ethnicity. Only 68% of respondents with a parent from an indigenous group self-identified as *indigena*.

Discrimination—We measured discrimination on the basis of both class and skin color. We measure class discrimination using responses to the question, "In the past 5 years, how often have you felt discriminated against, treated poorly, or treated unjustly because of your economic situation." We measure color discrimination using responses to the question, "In the past 5 years, how often have you felt discriminated against, treated poorly, or treated unjustly because of the color of your skin." Response categories for both questions ranged from never (=0) to many times (=3). In this study, these two questions were correlated (r=.53). Thirty-seven percent of those who experienced one-type of discrimination also experienced the other type of discrimination; 63% reported never experiencing either type of discrimination.

The structure of these two questions is similar to the structure of questions included in the Everyday Discrimination Scale (Krieger et al., 2005). Extensive pre-testing of these questions was conducted in all four countries and versions of these questions have been used previously by the Latin American Public Opinion Project (Seligson, Smith and Zechmeister, 2012).

Socio-Economic Status—Three measures of socio-economic status were evaluated – education, employment, and wealth. First, respondents reported their education in years ranging from 0 to 21 years. Second, each respondent who reported that they were currently working was classified as employed (yes=1, no=0). Third, because expenditure-based economic indicators have been found to be more reliable than income-based economic indicators in developing countries (Deaton, 1997), we followed techniques utilized by the Latin American Public Opinion Project (LAPOP) to create a wealth index (Córdova, 2008). Normed to have a mean of zero and ranging from -6.4 to 6.0, the wealth index consists of a weighted sum of two household characteristics (i.e. indoor plumbing and inside bathroom) and nine assets (stove, refrigerator, TV, telephone, washing machine, car, computer, flat screen TV, and internet service). The weights for each asset were the loadings on each item from a principle component analysis (PCA) where the loadings were allowed to vary by country and rural-urban location. The wealth index is highly correlated with the number of assets owned by each respondent (r=.88) and with years of education (r=.44). The KR-20 is .79 and provides a measure of internal consistency for an index based on dichotomous choices. An on-line supplement includes a report of the PCA.

Access to Medical Care—To account for differences in access to medical care, we control for whether respondents report any medical insurance coverage (1=yes, 0=no) or live in an urban area (1=yes, 0=no). Based on each countries census definition, *urban areas* were defined as those areas with more than 2500 residents in Mexico and 5000 adult residents in Peru, while they were administratively/legally defined in Brazil and Colombia.

Additional Demographic Control Variables—Several additional control variables are included in our analysis because of their potential to confound the relationship between skin color and SRH. We control for respondents' age as a continuous variable ranging from 18 to 65, female gender (1=yes, 0=no), whether the respondent had a spouse or cohabiting partner (1=yes, 0=no), whether the respondent attended religious services (0=never, 1= at least once or twice a year) and the strength of the respondent's pride in their race/ethnicity (1=low, 5=high). We also control for country of origin with Mexico as the reference category and indicator variables (1=yes, 0=no) for Colombia, Brazil, and Peru.

Data Analysis

Graphically and with logistic regressions controlling for age, gender, and country, we began our analysis by testing for differences in the odds of respondents reporting very good to good health by skin color, interviewer-ascribed race/ethnicity, and self-reported race/ethnicity (Figure 1). We then show the association between skin color and both interviewer-ascribed and self-reported race/ethnicity (Table 2). Next, we use graphs, logistic regressions, and ordinary least squares (OLS) regressions to describe associations of color- and class-based discrimination, education, and wealth with skin color (Figure 2). All regressions adjust for age, gender, and country of origin.

Our primary results are reported in Table 3 where we estimated a series of logistic regressions. In each regression, we add a different set of variables. Table 3, model 1 shows the primary association between skin color and health controlling for each of our demographic variables (i.e., age, gender, married or cohabiting, church attendance, ethnic pride, and country of origin). In model 2, we add interviewer-ascribed race/ethnicity to model 1. In model 3, we add self-reported race/ethnicity to model 1. In model 4, we add color- and class-based discrimination as well as an indicator for parent(s) with indigenous backgrounds to model 3. Next, we add years of education, wealth, health insurance and urban location (model 5). After controlling for education and wealth, current employment was never significantly associated with SRH and was excluded from model 5.

In additional analyses, we evaluated several interactions. First, we tested whether associations of discrimination, education and wealth with health varied by skin color or by self-reported race/ethnicity. All significant interactions are summarized in the results. Second, we tested whether associations of skin color, discrimination, and wealth with health varied by either country of origin or rural-urban residence. We summarize significant interactions in the results and have made an on-line supplement available with additional details.

Our analysis was conducted using STATA, version 13 (StataCorp 2013). Indicator variables included in the model for each country of origin adjust for mean differences in SRH by

country of origin. To adjust for the sampling design, we use a robust estimation of the standard errors with a correction for clustering on the sampling location (i.e. municipality within each country) for all regressions. Sampling weights are not available for the PERLA data and all estimates are unweighted. Thus, estimates reflect associations for this sample and should not be generalized to Latin America as a whole.

Results

Sample Characteristics

The majority of the PERLA respondents self-identified as *mestizo* (45%) and had light (40%) or medium (36%) skin tones (Table 1). On average respondents had 10 years of education and were employed (56%) with health insurance coverage (54%). Most lived in urban areas (76%), were middle-aged, and married or cohabitating (62%). Three out of four respondents were also Catholic but only 40% attended church weekly. Nineteen percent reported experiencing color-based discrimination; discrimination attributed to class occurred more frequently (33%).

Gradients in Self-rated Health, SES, and Discrimination

We found similar differences in SRH across skin color, interviewer-ascribed race, and self-reported race/ethnicity (Figure 1). Those with lighter skin tones and whites reported significantly higher rates of good to very good health than those with medium skin tones or *indigena* (72% vs. 57%, and 70% vs. 47%), respectively. However, darker-toned and black/ *mulato* individuals reported health at least as good as light-toned individuals and *mestizos* (67% vs. 66%, and 72% vs. 61%), respectively. Thus, the skin-color gradient in SRH appeared not to extend uniformly through the whole color spectrum. Those with medium skin tones and those who identified as *indigena* or were identified by interviewers as *indigena* reported the lowest rates of SRH (57% and 47%, respectively).

The similarities in SRH across skin color, interviewer-ascribed race, and self-reported race/ ethnicity reflect the strong associations between these three measures (Table 2). Among those with very light skin colors, 71% are classified as white by interviewers. Among those with dark skin colors, 70% are classified as black/*mulatto* by interviewers. The association between skin color and self-reported race/ethnicity is somewhat weaker. Yet, we still found that 81% of respondents with very light skin colors identified as white or *mestizo*, whereas 67% of those with dark skin colors identified as black/*mulatto*.

We also found significant skin color gradients in SES and discrimination (Figure 2). As a result, these two factors could potentially mediate the skin color gradients in SRH. Those with darker skin tones reported less education (β=-.85 95% CI -1.02--.67)) and wealth (β=-. 41 95% CI -.52--.31). Darker-skinned respondents also reported more color- (OR=1.98 95% CI 1.69-2.32) and class-based (OR=1.21 95% CI 1.11-1.32) discrimination.

Multivariable Analyses of Self-rated Health

After adjusting for country of origin and each of our demographic control variables, we found that the odds of reporting good-very good health decreased significantly as the

darkness of skin color increased. (Table 3, Model 1). Individuals with medium (OR=.60 95% CI .43-.83) or dark skin (OR=.61 95% CI .42-.88) tones had significantly lower odds of reporting good-very good health than light skinned individuals. This skin color gradient in SRH remained after adjusting for either interviewer-ascribed (Table 3, Model 2) or self-reported (Table 3, Model 3) race/ethnicity. These results suggest that neither interviewer-ascribed nor self-reported race/ethnicity fully mediate the relationship between skin color and SRH.

In Model 4 (Table 3), we adjusted Model 3 for color- and class-based discrimination. Because persons from indigenous backgrounds typically experience higher rates of mortality and morbidity than their non-indigenous counterparts (PAHO, 1997) and do not always self-identify as indigenous, we also add parent(s)' indigenous background to this model. We found that class discrimination (OR=.80 95% CI .73-.88), but not color-based discrimination was associated with lower rates of good-very good SRH. In additional models (not shown), we tested for an interaction between class- and color-based discrimination and found none. We also found that individuals with at least one indigenous parent reported a significantly lower odds (OR=.78 95% CI .68-.91) of good-very good health. At the same time, adjusting for discrimination and indigenous parentage did not affect the association between health and skin color (Model 4). These results suggest that neither color- nor class-based discrimination mediate the relationship between skin color and health.

On the other hand, SES, as measured by education (OR_{ed}=1.05 95% CI 1.03-1.05) and wealth (OR_{wealth}=1.10 95% CI 1.06-1.15) explained most of the skin-color gradient in health (Table 3, Model 5). Access to health care (OR_{urban}=1.53; $OR_{insurance}$=1.15 95% CI 1.27-1.83) explained the remaining difference in SRH between those with medium skin tones and those with very light skin tones (Table 3, Model 5). After adjusting for SES and access to health care, no SRH differences remained between individuals with lighter skin tones and those with darker skin tones. In addition, no SRH differences remained between individuals with an indigenous parent and those with no parent from an indigenous background.

In additional analyses (not shown), we built upon Table 3, Model 5 and evaluated interactions of wealth, education, and class discrimination with skin color. We found that the effects of wealth and class discrimination on health did not vary significantly by skin color or by self-reported race/ethnicity. However, education had a less positive association with health among respondents with medium skin tones (OR_{ed}=1.03 95% CI 1.01-1.05) than among those with very light skin tones (OR_{ed}=1.09 95% CI 1.04, 1.16).

Lastly, we re-estimated Table 3, model 5 with skin color as a continuous variable. The results were similar. We then evaluated differences in these results by urban location and by country (see on-line supplement for details). Interactions with urban location showed that there was no significant wealth gradient in rural areas. Wealth only had a strong positive association with SRH in urban areas (OR_{wealth}=1.14 95% CI 1.09-1.19). No other effects varied by urban location. Turning to differences by country, we found a negative association between darker skin color and good-very good SRH in Mexico (OR_{color}=.84 95 CI .82-.87) but, adjusted for all other covariates, this skin color association remained insignificant in all

other countries. In comparison to Mexico where we found no wealth gradient in health, Brazil (OR_{wealth}=1.18 95% CI 1.10-1.26) and Colombia (OR_{wealth}=1.14 95% CI 1.04-1.25) had significant wealth gradients in health.

Discussion

Few studies have evaluated the relationship between race/ethnicity and health or between SES and health across Latin America countries (Braveman & Tarimo, 2002). However, as income inequality has grown and as pressure has mounted to reform health and social insurance systems within Latin America countries (OECD, 2011; Zunzunegi et al., 2009), it is increasingly important to understand how race/ethnicity and SES shape health. Using data from the PERLA study, we examined the combined associations of skin color, race/ethnicity, discrimination, and SES with SRH. Our analysis makes several contributions to the literature on health disparities in Latin America.

First, we compared and contrasted differences in SRH by skin color, self-reported race/ethnicity, and interviewer-ascribed race-ethnicity. We find strong gradients in health by skin color which remain after adjusting for either self-reported race/ethnicity or interviewer-ascribed race/ethnicity. However, after adjusting for skin color, self-reported race/ethnicity had no association with SRH. These results suggest that ethnoracial self-identifications *do not* mediate the influence of skin colors on health. Self-identifications can reflect SES, political, and social pressures to identify with majority rather than minority status groups (Ford & Harawa, 2010). Skin color, in contrast, is not subject to these same political and social pressures. Our results are consistent with previous research showing that darker-skinned individuals report poorer physical, mental, and infant health outcomes than lighter-skinned individuals (Abdulrahim, et al., 2012; Montalvo & Codina, 2001; Macinko et al., 2012; Landale & Oropesa, 2005; Veenstra, 2011) in the United States and Canada. Most importantly, these results demonstrate the value of collecting skin color data in health studies designed to understand ethnoracial disparities in health and illness.

Second, we found that individuals reporting indigenous parentage in Latin America have lower SRH than those reporting no indigenous parentage. Other existing studies tell a similar story. Indigenous populations throughout Latin America tend to live in more isolated environments with less access to nutritious food and clean water and experience higher rates of mortality and morbidity than their non-indigenous counterparts (Montegro & Stephens, 2006; PAHO, 1997). Indigenous populations have also been marginalized (Montenegro & Stephens, 2006). As a result, persons with indigenous parents may sometimes prefer to self-identify as white or *mestizo*, especially if they live in urban areas and are proficient in Spanish (Wade, 1997; Telles & Flores, 2013). Persons who choose to report and embrace their indigenous heritage may be more highly politicized with less socio-economic mobility than those who choose a white or *mestizo* identity (Yashar, 2005; Van Cott, 2005).

Third, we found that class discrimination has a stronger negative association with SRH than color discrimination in Latin America. However, both explained little of the association between skin color and health. This was true despite the fact that both forms of discrimination increase significantly with skin color. Based on these results, we conclude

that the effects of skin color on health are not mediated through either class or color discrimination to any significant degree. Klonoff and Ladrine (2000) as well as Golash-Boza & Darity (2008) have previously identified strong relationships between skin color and discrimination among Latino and Black populations in the United States. Our results confirm that a similar relationship exists in Latin American. They also confirm the positive association found between discrimination and health problems in previous studies of Brazil and Mexico (Faerstein et al., 2004; Ortiz-Hernandez, et al. 2011; Pavao et al., 2012; Santana et al. 2007).

Finally, we found significant gradients in SRH by education and wealth, and gradients in education and wealth by skin color. Previous literature finds significant socio-economic gradients in health among various Latin American populations (Almeida-Filho et al., 2004; Dachs et al., 2002; Hurtado, Kawachi, & Sudarsky, 2011; Szwarcwald et al., 2005; Travassos et al., 2011; Wong, Palàez, Palloni, 2005). Our results demonstrate that these socio-economic differences fully mediate the association between skin color and SRH among Latin Americans from Brazil, Colombia and Peru. However, interactions between skin color and country of origin indicated that darker-skinned individuals in Mexico continued to have poorer health even after accounting for SES. Our examination of interactions also showed that the positive association of education with good-very good SRH was strongest among respondents with light skin tones. As education levels increased, medium-skinned adults did not benefit from the same improvement in SRH as lighter-skinned adults. The association of wealth with health was strongest in urban areas, and in Brazil and Colombia. These results are consistent with research demonstrating that poverty and income inequality are greater in Brazil and Colombia than in Mexico or Peru, and greater in urban areas than in rural areas (UN-Habitat, 2012).

Though our research makes a substantial set of contributions to understanding ethnoracial health disparities in Latin America, we recognize its limits and the need to develop future research building on these findings. First, our research is cross-sectional. Thus, we are unable to evaluate how race/ethnicity, SES, and discrimination work together to shape health over the life course. Second, this analysis focuses on a single measure of health – self-reported health. Although this measure is widely utilized and highly correlated with morbidity and mortality, such a global measure can mask important differences in specific health outcomes (e.g., depression, hypertension, or obesity) by race/ethnicity, gender, and SES. Third, this analysis utilizes measures of class- and color-based discrimination which are each based on answers to a single question. Multi-item scales may result in less recall bias and a higher frequency of discrimination experiences (Krieger et al., 2005).

Most importantly, this analysis is limited to four Latin American countries. With a combined population of about 392 million people in these four countries, they comprise about two-thirds of the population in Latin America (World Bank, 2013). Nevertheless, it is important to recognize that countries throughout Latin America have unique cultures, histories, and health systems that can contribute to substantial differences in health outcomes not only across countries but also within countries. More detailed country-specific research on disparities in health is needed throughout Latin America.

This study has provided an initial examination of ethnoracial health disparities in Latin America based on skin color. We find exposure to discrimination and low SES increase with skin color and that low SES accounts for most of the association between skin color and health. As research on health disparities in Latin America continues, studies should move beyond self-reported ethnoracial classifications and further evaluate how phenotypical ascriptions such as skin color influence a variety of health outcomes. To make this possible, we need to expand the collection of these data in Latin American health statistics systems.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Highlights

- Uses newly collected data on 4921 adults from Brazil, Colombia, Mexico, and Peru

- Examines multiple measures of race/ethnicity and their associations with health

- Finds significant skin-color gradients in self-reported health.

- Finds significant skin-color gradients in class-based discrimination and low SES.

- SES and class-based discrimination largely account for disparities in health by skin color.
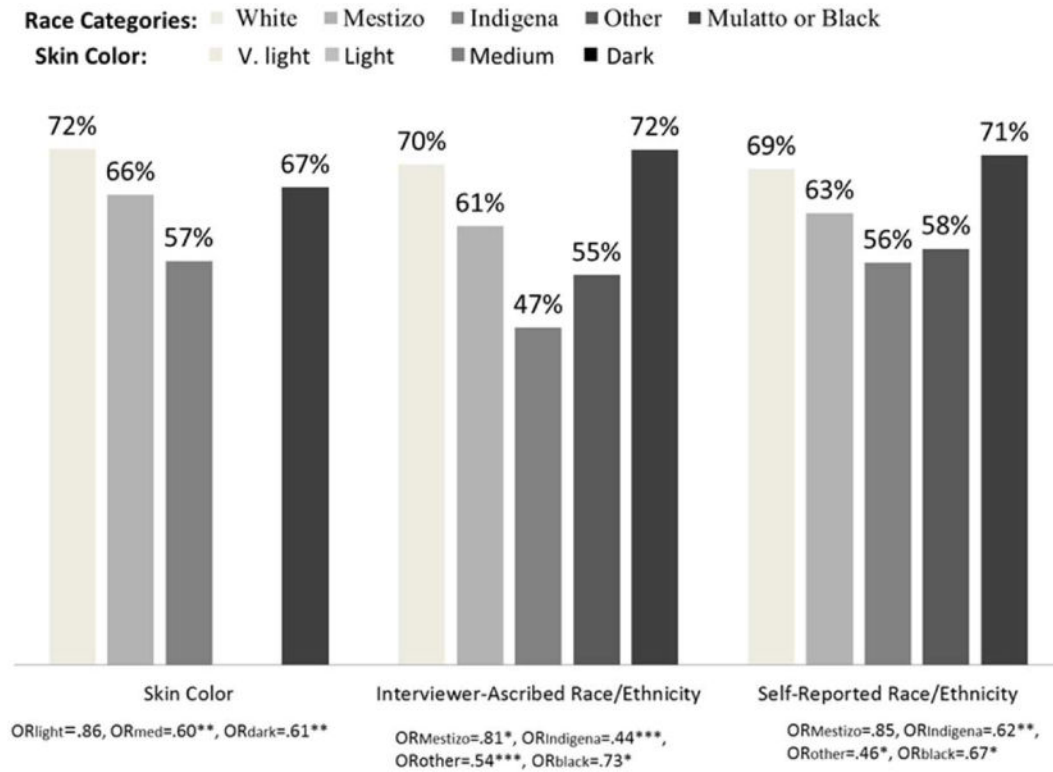
Figure 1. Very Good to Good Health by Skin Color, Interviewer-Ascribed Race/Ethnicity, and Self-Reported Race/Ethnicity (All countries, N=4,921)
*p<.05, ** p<.01, ***p<.001

Note: Odds Ratios (OR) are estimated from logistic regressions of self-reported health on skin color, interviewer-ascribed race/ethnicity, and self-reported race/ethnicity, respectively. All regressions included controls for sex, age, and country of origin.

A. Mean Years of Education

Years Education: B_{color}=-.85, 95% CI=[-1.02, -.67], p<.0001

B. Mean Wealth Index

Wealth Index: B_{color}=-.41, 95% CI=[-.52,-.31], p<.0001

C. % Experienced Color Discrimination

Color Discrimination: OR_{color}=1.98, 95% CI=[1.69,2.32], p<.0001

D. % Experienced Class Discrimination

Class Discrimination: OR_{color}= 1.21, 95% CI= [1.11,1.32], p<.0001
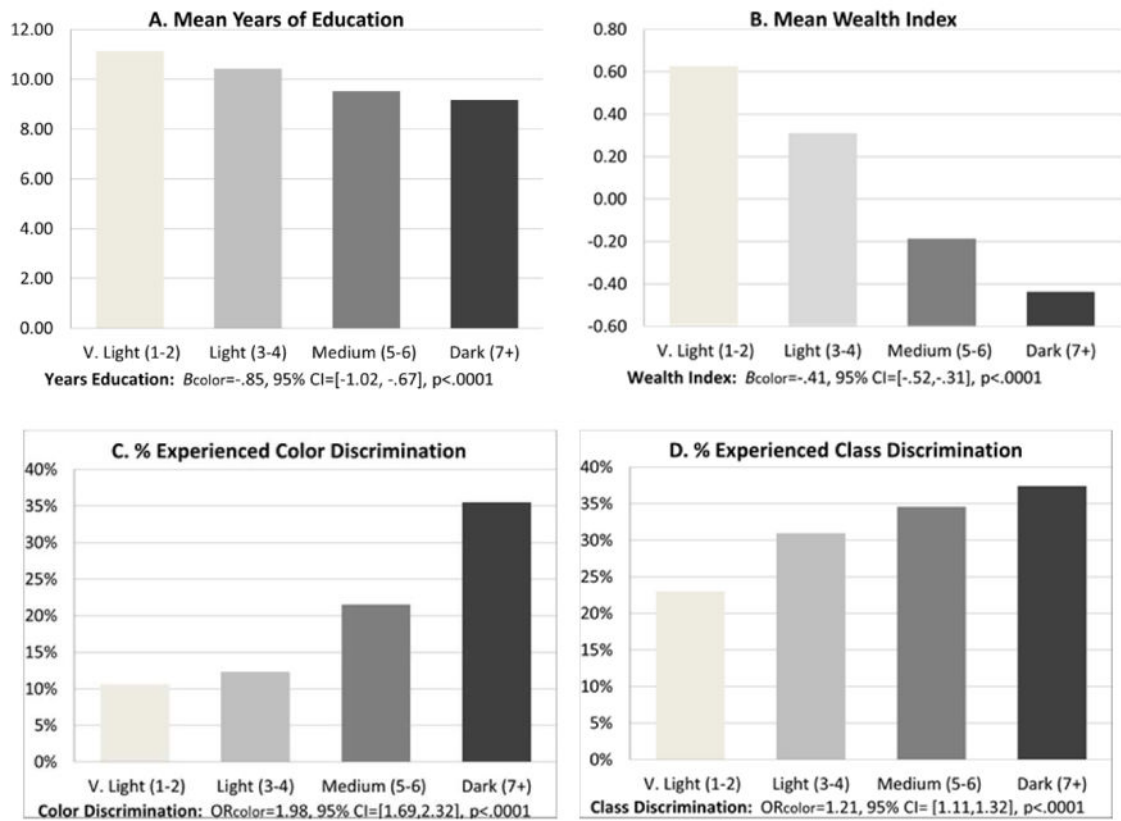
Figure 2. SES and Discrimination, by Skin Color (All countries, N=4,921)
*p<.05, **p<.01, ***p<.001
Note: Ordinary least squares regressions were estimated to show the associations of skin color with years of education and wealth, respectively. Logistic regressions were estimated to show the association of skin color with the experiencing any color discrimination and any class discrimination, respectively. All regressions included controls for sex, age, and country of origin.

Table 1

Means of Independent Variables (N=4921)

	Mean/%	(sd)
Color and Race/Ethnic Identification		
Color:Very Light	7%	--
Color: Light	40%	--
Color: Medium	36%	--
Color: Dark	17%	--
Int Race/Ethnicity: White	18%	--
Int Race/Ethnicity: Mestizo	53%	--
Int Race/Ethnicity: Indigena	10%	--
Int Race/Ethnicity: Mulato or Black	16%	--
Int Race/Ethnicty: Other	3%	
Slf Race/Ethnicty: White	9%	--
Slf Race/Ethnicity: Mestizo	45%	--
Slf Race/Ethnicity: Indigena	28%	--
Slf Race/Ethnicity: Mulato or Black	16%	--
Slf Race/Ethnicity: Other	2%	--
Parent Indigenous	23%	--
Discrimination		
Experienced Color Discrimination		
Never	81%	--
A little	10%	--
Sometime	7%	--
A lot	2%	--
Experienced Class Discrimination		
Never	67%	--
A little	16%	--
Some	13%	--
A lot	4%	--
Socio-Economic Status		
Years of Education	9.94	(5.06)
Wealth Index	0.03	(1.80)
Employed	56%	--
Health Access		
Any Health Insurance	54%	--
Urban	76%	--
Demographic Control Variables		
Male	48%	--
Age	37.35	(13.24)
Married or Cohabitating	62%	--
Religiosity		

	Mean/%	(sd)
Never/Not Religious	20%	--
Once per month or less	40%	--
Once per week+	40%	--
Strength of Ethnic Pride	4.36	(0.72)
Mexico	27%	--
Colombia	27%	--
Peru	28%	--
Brazil	18%	--

Table 2

Percent of respondent in each interviewer-ascribed or self-reported race/ethnic category, by skin color

	V. Light (1-2) (N=339)	Light (3-4) (N=1,970)	Medium (5-6) (N=1,775)	Dark (7+) (N=837)
Panel A. Interviewer-Ascribed Race/Ethnicity				
White	70.80	28.68	2.87	0.96
Mestizo	20.94	60.51	67.72	17.20
Indigena	1.47	5.74	15.89	9.08
Mulatto or Black	3.54	1.78	10.08	69.65
Other	3.25	3.29	3.44	3.11
	ORcolor =7.46, 95% CI [6.73, 8.28], p<.0001			
Panel B. Self-Reported Race/Ethnicity				
White	27.73	14.92	3.72	0.60
Mestizo	52.51	55.58	46.59	14.81
Indigena	13.86	24.82	38.93	16.01
Mulatto or Black	3.54	2.34	9.13	67.03
Other	2.36	2.34	1.63	1.55
	ORcolor =4.37, 95% CI [4.02, 4.74], p<.0001			

Note: Using ordered logistic regresions, we estimated the association between skin color and interviewer-ascribed and self-reported race-ethnicity, respectively. These regressions controlled for sex, age, and country of origin.

Table 3

Logistic Regressions on Good to Very Good Self-Rated Health (N=4,921)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Color: V. Light (ref)	1.00	--	1.00	--	1.00	--	1.00	--	1.00	--
Color: Light	0.86	(0.61, 1.21)	0.88	(0.60, 1.30)	0.90	(0.65, 1.26)	0.91	(0.65, 1.28)	0.98	(0.72, 1.35)
Color: Medium	0.60	(0.43, 0.83) **	0.65	(0.44, 0.97) *	0.65	(0.48, 0.89) **	0.66	(0.49, 0.90) **	0.79	(0.59, 1.04)
Color: Dark	0.61	(0.42, 0.88) **	0.67	(0.42, 1.06)	0.68	(0.45, 1.02)	0.69	(0.46, 1.05)	0.89	(0.59, 1.34)
Int Race/Ethnicity: White (ref)	--	--	1.00	--	--	--	--	--	--	--
Int Race/Ethnicity: Mestizo	--	--	0.95	(0.77, 1.18)	--	--	--	--	--	--
Int Race/Ethnicity: Indigena	--	--	0.55	(0.40, 0.76) ***	--	--	--	--	--	--
Int Race/Ethnicity: Mulato or Black	--	--	0.95	(0.70, 1.29)	--	--	--	--	--	--
Int Race/Ethnicity: Other	--	--	0.63	(0.41, 0.97) **	--	--	--	--	--	--
Slf Race/Ethnicity: White (ref)	--	--	--	--	1.00	--	1.00	--	1.00	--
Slf Race/Ethnicity: Mestizo	--	--	--	--	0.94	(0.72, 1.23)	0.97	(0.74, 1.26)	0.91	(0.71, 1.16)
Slf Race/Ethnicity: Indigena	--	--	--	--	0.73	(0.52, 1.01)	0.86	(0.60, 1.22)	0.96	(0.67, 1.38)
Slf Race/Ethnicity: Mulato or Black	--	--	--	--	0.85	(0.56, 1.28)	0.89	(0.58, 1.35)	0.91	(0.61, 1.35)
Slf Race/Ethnicity: Other	--	--	--	--	0.52	(0.27, 1.00)	0.56	(0.30, 1.02)	0.64	(0.34, 1.19)
Parent Indigenous	--	--	--	--	0.78	--	0.78	(0.68, 0.91) ***	0.87	(0.75, 1.02)
Color Discrimination	--	--	--	--	1.04	--	1.04	(0.90, 1.20)	0.99	(0.86, 1.15)
Class Discrimination	--	--	--	--	0.80	--	0.80	(0.73, 0.88) ***	0.82	(0.75, 0.90) ***
Years of Education	--	--	--	--	--	--	--	--	1.05	(1.03, 1.06) ***
Wealth Index	--	--	--	--	--	--	--	--	1.10	(1.06, 1.15) ***
Any Health Insurance	--	--	--	--	--	--	--	--	1.15	(1.03, 1.29) *
Urban	--	--	--	--	--	--	--	--	1.53	(1.27, 1.83) ***
Pseudo R-squared	0.09		0.09		0.09		0.09		0.12	

Note: All models are calculated with robust standard errors adjusted for clustering by sample location (i.e. municipalities within each country).

All models include demographic controls for age, gender, married or cohabitating, attends church, strength of ethnic pride, and country (not shown). Employment is not significant after adjusting for other measures of SES and was removed from model 5. In model 6, Age (OR=.97), Male (OR=.97), Age (OR=1.31), and Country (ORbrazil vs. Mexico=1.55; ORColombia vs. Mexico=1.97; ORperu vs. Mexico =.53) are each significant at the level of p<.05. No other demographic control variables are significant.