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THE COLOR OF CHILD MORTALITY  
IN BRAZIL, 1950–2000  
Social Progress and Persistent Racial Inequality

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*Abstract: Now that racism has been officially recognized in Brazil, and some universities have adopted affirmative-action admission policies, measures of the magnitude of racial inequality and analyses that identify the factors associated with changes in racial disparities over time assume particular relevance to the conduct of public debate. This study uses census data from 1950 to 2000 to estimate the probability of death in the early years of life, a robust indicator of the standard of living among the white and Afro-Brazilian populations. Associated estimates of the average number of years of life expectancy at birth show that the 6.6-year advantage that the white population enjoyed in the 1950s remained virtually unchanged throughout the second half of the twentieth century, despite the significant improvements that accrued to both racial groups. The application of multivariate techniques to samples selected from the 1960, 1980, and 2000 census enumerations further shows that, controlling for key determinants of child survival, the white mortality advantage persisted and even increased somewhat in 2000. The article discusses evidence of continued racial inequality during an era of deep transformation in social structure, with reference to the challenges of skin color classification in a multiracial society and the evolution of debates about color, class, and discrimination in Brazil.*

“All nations carry with them the scars of the past, yet Brazil bears the ‘burden of history’ more visibly than most.” With this observation, Marshall Eakin (1997, 8) began his well-known introduction to Brazil, intent on capturing the paradoxes that define this immense and varied country. In Brazil, Eakin contended, the modern and traditional are not separate and static spheres but, rather, coexist as interpenetrated and changing facets of the same evolving reality.

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If the past insinuates itself into the present in countless domains in Brazil, it does so with special force with respect to the country's African heritage. The coerced passage of more than 3 million Africans in the seventeenth and eighteenth centuries alone was ten times the number of slaves conscripted and brought to North America. By 1822, the year of independence, two-thirds of Brazil's total population of 4 million was of African descent (Brown 1997). The legacy of that painful history is visible today in the color of the country's population and in the hybrid fabric of Brazilian culture.

With the largest African origin population of any nation outside of Nigeria, the Brazilian race question has long prompted interest among scholars and activists. Today, racial matters have made their way into the broad arena of public discourse, prompted mainly by the official recognition of racial discrimination and some universities' unprecedented, and largely unexpected, adoption of race-based admission policies. In the context of these events, estimates of the magnitude of racial inequality and estimates of changes in racial differences over time become a valuable resource in the conduct of public debate and in the formulation of effective policy.

We contribute to this agenda by using data from the decennial demographic censuses from 1950 to 2000 to estimate racial differences in child mortality. The probability of death in the early years of life, by virtue of its sensitivity to the cumulative effect of such variables as income, education, and housing quality is a robust measure of a population's quality of life. Child mortality rates, in turn, can be used to generate estimates of the average number of years of life expected at birth for the white and the Afro-Brazilian populations. As our findings show, the 6.6-year advantage in average length of life that whites enjoyed in 1950 remained virtually unchanged in 2000, despite the substantial improvement in living standards that accrued during the period to both the white and the Afro-Brazilian populations.

Data sets constructed from random samples of individual records drawn from the 1960, 1980, and 2000 census enumerations also make possible the use of multivariate statistical techniques to identify the relative magnitude of the mortality effects of household income, parental education, place of residence, and housing quality. To interpret the findings and as a means to discuss the implications of the results, we develop a conceptual framework that specifies the pathways through which racial inequality and discrimination influence the socioeconomic and proximate factors that determine child survival.

Together with the estimates of life expectancy, the individual-level analyses provide unique insights into the nature of racial inequality during the second half of the twentieth century. A review of the evolving literature on color, class, and discrimination in Brazil establishes the context for noting the significance and implications of the findings presented in this study.

## COLOR, CLASS, AND DISCRIMINATION

Explanations of racial inequality tend toward two competing narratives. One traces its origins to Brazil's eminent sociologist, Gilberto Freyre (1946), whose idyllic vision of a colonial past provided an explanation for the lack of overt and hostile racism in modern Brazil, and whose analysis of race relations established the intellectual foundations for proclaiming Brazil a "racial democracy" (Needell 1995, 52). Freyre, along with eminent North American Brazilianists who followed his lead, such as Carl Degler (1971) and Charles Wagley (1952), contended that dark skin tone was a salient social marker, but race itself neither posed a significant barrier to upward mobility nor constituted an obstacle to social acceptance for those who rose in rank. As opportunities for upward mobility increased, Wagley (1969, 60) predicted that "larger numbers of people will rise in the social system," and "the great contrasts . . . between the darker lower strata and the predominantly white upper class should disappear." But even then, Wagley, with his usual acumen, saw dangers along the road to this ideal. He ended his observations on a more ominous note, calling attention to indications that "discrimination, tension, and prejudices based on race" were beginning to appear in the metropolitan areas of the country (Wagley 1969, 65).

In the early 1960s, Florestan Fernandes (1964), one of Brazil's most distinguished sociologists, openly challenged the racial democracy thesis, finding the cause of racial inequality in the troubled integration of former slaves into the free labor market in the postslavery period, a time when Afro-Brazilians competed for jobs with white European immigrants. Despite the force of Fernandes's publications, the firmly entrenched racial democracy thesis remained largely in place at least until the late 1970s, when a new generation of scholars took up the topic using different theoretical and methodological approaches. Carlos Hasenbalg (1979) turned the focus away from the legacy-of-slavery thesis in favor of a more insightful interpretation that pointed to the new meanings and functions that prejudice and discrimination acquired within the logic of capitalist development in postabolition Brazil.

A major impetus for the new turn in racial studies came from the availability of census and survey data that permitted the use of statistical techniques to measure the magnitude of the racial divide, making it possible to detect the presence of discrimination in many walks of life. In his dissertation at the University of Michigan, Nelson do Vale Silva (1978) used sample data from the 1960 demographic census to refute the widely held notion that prejudiced attitudes, though present, did not translate into discriminatory behavior. Silva showed that income differences between whites and nonwhites remained significant, even controlling for the variables relevant to economic attainment, a finding that was understood to

reflect the presence of discriminatory practices in the labor market. Following Silva's lead, subsequent research by Peggy Lovell (1994) found that discrimination accounted for 24 percent of the wage gap between white and Afro-Brazilian men in the urban labor force, which could be explained by unequal wage returns to equal human capital endowments (see also Lovell 2006). As evidence of discrimination in labor markets mounted (Hasenbalg 1999; Silva 1981, 1985, 1999), researchers turned to other social indicators to find further indications of racial discrimination in various aspects of social life, including child mortality (Lovell and Wood 1998; Wood and Carvalho 1988; Wood and Lovell 1992), the physical aggression perpetrated by the police (Mitchell and Wood 1999), and the underrepresentation of Afro-Brazilians in the media and television entertainment (Leslie 1999; Silva 1999).

In contrast to the ethnographic complexion of earlier research, the statistical turn in the 1970s and 1980s added a much-needed quantitative dimension to race studies in Brazil. Yet the census survey data that were the basis of the new approach contained no information on people's attitudes about racial prejudice or about their perceptions of color discrimination. Direct evidence of the prevalence of prejudiced attitudes that could be generalized to the country as a whole awaited the publication of the results of a nationwide survey carried out in 1995 by Brazil's largest newspaper, *Folha de São Paulo*, in association with its polling agency, Datafolha (Turra and Venturi 1995). The questionnaire applied to a sample of 5,081 men and women included items that asked about the respondent's own racial attitudes and the attitudes held by others. The question, "Are whites prejudiced against blacks?" went straight to the point and elicited answers many found surprising. Regardless of age, sex, level of education, and region of the country, around 90 percent of all respondents regardless of color answered yes to the question (Turra and Venturi 1995, 96).

The idea that Afro-Brazilians acknowledged the presence of color prejudice in daily life is revealing for many reasons, but especially so because many explanations for the relative dearth of race-based social movements are predicated, to one degree or another, on the assumption that Afro-Brazilians themselves suffered from a lack of racial consciousness and were therefore disinclined to engage in collective action (Andrews 1992; Dzidziengo 1985; Fontaine 1985; Hanchard 1994, 1999; Hasenbalg and Silva 1992; Marx 1998; Reichmann 1999). Other explanations for unsuccessful identity formation pointed to class divisions (Andrews 2004), the lack of a clear target against which to mobilize (Marx 1998), and Afro-Brazilians' resistance to the label *negro* (Burdick 1998).

Stanley Bailey (2004) followed up the Datafolha project with a survey of his own in Rio de Janeiro. His findings demonstrated that a significant number of Brazilians in each color category not only expressed support

for affirmative action policies but also had an interest in belonging to anti-racism organizations. Brazilian public opinion thus appears to be more attuned to the reality of racial discrimination and more receptive to affirmative action than the racial democracy thesis had been interpreted as implying.<sup>1</sup> “The error,” Bailey (2004, 741) concluded, “has consisted of attributing to ordinary Brazilians a romanticized Freyrean or ‘racial paradise’ interpretation of the racial democracy myth.”

Much of the credit for setting affirmative action in motion has been attributed to President Fernando Cardoso, whose interest in the issue dated back to his dissertation research and his early publications with Otavio Ianni (e.g., Cardoso and Ianni 1960). In his presidential speech on Independence Day in 1995, Cardoso broke with tradition when he openly recognized racism in Brazil and emphasized the value of the nation’s racial and cultural traditions (Nobles 2000). The following year, Cardoso’s National Human Rights Program recognized, for the first time in Brazilian history, Afro-Brazilians as a category for targeting public policy. Because no pro-affirmative action constituency was sufficiently powerful to credibly promise votes, Cardoso and others, according to Htun (2004, 61–62), were presumably motivated by personal conviction and a sense of social justice rather than material gain or electoral self-interest. But not everyone accepts the notion that the change in official discourse was the simple product of political will. Telles (2004, 264), for one, argues that, by 1998, identifying with Afro-Brazilians had become an asset in electoral politics, a factor that accounted for Cardoso’s often-cited statement that he himself had “one foot in the kitchen,” meaning that he, like most Brazilians, had African ancestry.

Whereas the full story of the new policy agenda has yet to be told, one event—the Third World Conference on Racism, Racial Discrimination, Xenophobia, and Intolerance, held in Durban, South Africa, from August 30 to September 7, 2001—is widely recognized as decisive to the policy turnaround. Other factors that played a role included the emergence and influence of race-based issue networks (Htun 2004, 2005), the effective use of international forums by Brazil’s black movement, and the activities of private foundations and nongovernmental organizations (Bailey 2008; Santos 2006; Telles 2004). The conference, and especially the many preparatory meetings that led up to it, “served as political access structures” that brought together as never before the state and a cadre of reenergized

1. Whereas the evidence from Datafolha and Bailey support the conclusion that the Brazilian public is more attuned to the reality of racial discrimination than once thought, the data from the two sources cannot tell us whether the same can be said about earlier years. Hence, we cannot rule out the possibility that the racial-democracy thesis dominated public opinion in decades past. This caveat is consequential given that many explanations for the lack of black political mobilization (as noted earlier) assume that the racial democracy thesis dominated public discourse and understanding.

antiracist activists in the context of an international forum that “shattered any lingering state discourse denying discrimination” (Bailey 2008, 584).

The “post-Durban transformation” (Telles 2004, 72) resulted in a surprisingly rapid endorsement of affirmation action, evidenced by the adoption in 2001 of race-targeted admission criteria at two state universities in Rio de Janeiro, with the State University of Bahia following suit a year later. When Luis Inácio Lula da Silva was elected president in 2003, the momentum established by the Cardoso regime enabled Lula to give black movement actors a presence in the government through, for example, the Special Secretariat for the Promotion of Racial Equality, headed by Matilde Ribeiro, a member of the black movement and the Worker’s Party. Brazil’s affirmative action agenda, however partial at present, ranks as one of the most impressive attempts to redress racial grievances among similar programs undertaken in other countries in the region (Andrews 2004). How far the country will go down the affirmative action road cannot be known, yet the mere facts that it considers such policies and that racism has been officially recognized unmistakably marks a new era in the country’s social history.

Whether affirmative action will reduce racial inequality in Brazil is an issue that will surely command the attention of analysts in years to come. Answers to this question will necessarily rely on a classification system that correctly identifies the population by race and that is sufficiently stable to produce data that are comparable over time. When the objective is to generate cross-sectional and time-series data at the national level, we must necessarily come to grips with formidable issues associated with the skin-color typology used in demographic censuses.

#### COLOR, IDENTITY AND THE CENSUS

In the decennial census enumerations the Brazilian census bureau simply asks respondents to choose their own identity among precoded skin-color options. The race item in the 1950 census grouped responses into three categories: black (*preto*), white (*branco*), or yellow (*amarelo*). Individuals who declared themselves somewhere in between (e.g., *mulato*, *caboclo*, *moreno*, *indio*) were classified as *pardo* (brown). The method was modified in 1960 when the questionnaire added a precoded intermediate category, *indio*. The color item was not included in the 1970 census, but it was reintroduced in 1980. The 1991 and 2000 censuses used the self-identification method and a five-category scheme: *branco*, *pardo*, *preto*, *amarelo*, and *indígena* (indigenous). Table 1 shows the census-based estimates of the color distribution of the Brazilian population since 1950.<sup>2</sup>

2. Treatments of racial classification and skin color in Brazil confront numerous terminological challenges. In keeping with Brazilian census data, we use the term *color* whenever

Table 1 *Percentage Distribution of the Population by Skin Color, Brazil, 1950–2000*

Color	1950	1960	1980	1991	2000
White	61.7	61.0	54.2	51.6	53.7
Brown	26.5	29.5	38.8	42.6	38.9
Black	11	8.7	5.9	5.0	6.2
Yellow	0.6	0.7	0.7	0.4	0.4
Missing/Other	0.2	0.1	0.4	0.4	0.7
Total	100.0	100.0	100.0	100.0	100.0
N (000s)	51,944	70,191	119,011	146,815	169,872

Source: Demographic censuses, various years.

Note: "Other" includes "indígena."

The method of data collection based on self-declared responses to pre-coded options is subject to at least three major caveats. The first issue pits the simplified typology used in official surveys and censuses against the extraordinary complexity of the system of color classification that Brazilians commonly use in their daily lives. Anthropological research on race relations in Brazil amply documents the fine distinctions Brazilians make when asked to identify a person's skin color (Harris 1964). An open-ended question on racial self-identification included in the 1976 National Household Survey (Pesquisa Nacional por Amostra de Domicílios) elicited 134 different terms (Silva 1981), ranging, in alphabetical order, from *acastanhada* (caramel colored) to *vermelha* (reddish).<sup>3</sup> However, only seven designations of skin color accounted for the vast majority of the responses (95 percent), four of which were the terms the census used. When Silva (1981) compared responses to the open-ended question to the forced-choice item used in the census, he concluded that there was a high degree of consistency between the two methods of data collection. The same exercise, repeated in the July 1998 Monthly Employment Survey, suggested the same conclusion (Schwartzman 1999). Whereas nearly two hundred terms for

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the discussion concerns observations based on census classifications. We use the term *race* when the discussion concerns the literatures in history and the social sciences, recognizing at the same time that race, in this context, is a social construct, not a genetic marker. When we move from Portuguese to English, we translate the term *pardo* as "brown" to avoid inappropriate connotations associated with other terms, such as *mulatto*. We write the terms *white*, *black*, and *brown* in lowercase, and when we treat black and brown as a single category, we refer to the classification as Afro-Brazilian. We also refer to people of African descent, or Afro-descendants. We do so as a means of identifying brown and black Brazilians, but we are cognizant of Schwartzman's (1999) evidence that African heritage is not a prominent feature of Afro-Brazilian identity.

3. A list of the 134 terms can be found at <http://www.zonalatina.com/Zldata55>.

skin tone were recorded, only a handful accounted for the vast majority of responses, just as they had twenty-two years earlier.

The second caveat concerns the conflation of class and color. As in other countries in the region, a dark-skinned Brazilian who is also poor is likely to be thought of, and to classify him- or herself, as black (*preto*). In contrast, a high-status person of the same dark tone is more likely to be thought of, and to classify him- or herself, as brown (*pardo* or *moreno*) or as some other term closer to the white end of the color continuum. Subjective identity in Brazil is therefore based on physical appearance but always in combination with other factors, such as income, education, and related insignias of social rank.

The multidimensional basis of racial identity leads to the third caveat, namely the possibility that an upwardly mobile individual who identifies him- or herself as black at one point in time may later, after rising in socio-economic status, reclassify him- or herself as brown. To estimate the mobility of people from one color category to another, one study (Wood 1991) applied the forward-survival technique that demographers commonly use to estimate rates of net migration. The results showed that over the thirty-year period between 1950 and 1980, the black color category experienced a net loss of around 38 percent to other color categories; the intermediate brown category experienced a net gain of 36 percent; and the white color category remained comparatively stable over time, with a comparatively small net loss of 9 percent. Estimates for the 1980–1991 period, adjusted for the effects of international migration, revealed the same pattern, although the magnitude of color reclassification may have declined somewhat during the 1980s (Carvalho, Wood, and Andrade 2004).

The white self-classification thus appears to be relatively stable over time, at least up to 2000. However, if affirmative action policies have the effect of making nonwhite classification desirable, the stability of white self-classification may weaken in the future (Telles 2004). Using a 2002 social survey (*Pesquisa Nacional Brasileira*), Bailey (2008) found that the mere mention of racial quotas nearly doubled the proportion of respondents who opted for the black designation, from 4.8 percent to 8.8 percent.

When mobility-related color reclassification is prevalent, the selective exodus of upwardly mobile people from the black category introduces a downward bias in analyses that seeks to track changes in the progress of the black population. Similarly, the black-to-brown reclassification among successful black individuals would introduce an upward bias in analyses that tracks the progress of the brown population (Carvalho, Wood, and Andrade 2004). The selectivity bias, together with the relative small percentage of people who declare themselves black in Brazil (6.2 percent in 2000), prompted researchers to merge the black and brown designations into a single Afro-Brazilian category (e.g., Lovell 1994; Wood and

Carvalho 1988; Wood and Lovell 1992) or to use both the aggregated and separated versions in the same study (e.g., Lovell 2000).

It is not surprising that the strategy of converting the already-simplified census typology to a dichotomy of white and Afro-Brazilian has been criticized for imposing an inappropriate bipolar racial scheme on Brazil (Harris et al. 1993). Others counter that, regardless of the profusion of linguistic terms that apply to gradations of skin color, in the practice of daily interactions, the great divide is nonetheless between white and nonwhite (Sheriff 2001). Brazilian race relations may therefore be more bipolar than has traditionally been thought (Andrews 1996; Skidmore 1993).

In her ethnography of the modern plantation town of Bom Jesus da Mata in the Brazilian northeast, Nancy Scheper-Hughes (1992, 543n3) noted that, even though a rich popular culture of racial diversity gives the appearance of racial democracy, "it means little or nothing to wealthy and upper-middle-class white households, where there is no ambiguity on the color issue and where mulattoes and blacks are easily recognized, labeled, and treated as social inferiors." Robin Sheriff, who studied race relations in a favela in Rio de Janeiro is similarly unequivocal on the matter, concluding that intermediate terms between white and black are best understood as figures of speech rather than as meaningful color categories. In the words of one favela resident, terms like *parda*, *mulata*, and *morena* function as euphemisms, because "as everyone knew, there are but two races" (Sheriff 2001, 39).

Edward Telles (2004) proposed a conceptual distinction that goes a long way toward clearing up the confusion. He noted that the first generation of scholars, mostly anthropologists, focused on sociability among equals. By invoking this perspective, the findings largely underscored the conclusion that, unlike in the United States, race relations in Brazil were far more harmonious and integrative. Other analysts shifted the focus from the interaction among equals to an emphasis on the relations between dominant and subordinate groups. The conceptual shift brought to light the prejudices held by whites and the disparities between the racial groups. The distinction, which Telles refers to as vertical and horizontal relations, respectively, is applicable here: gradations of socially recognized shades of skin tone are relevant to analyses that focus on horizontal race relations, but the black-white dichotomy is more pertinent to analyses that target vertical race relations. The prevalence of dichotomous thinking among persons of unequal status is reflected in the wry comment often heard when conversation turns to the problem of racial classification in Brazil: "If you have trouble knowing who is black and who isn't just ask a doorman in a fancy building or policeman on the street. They always know."

Four conclusions can be drawn from the debate concerning the skin-color typology used in the census: First, a classification scheme based on a self-declared choice among predetermined options, though far from per-

fect, produces results that are reasonably consistent with other methods of data collection. Second, because a large proportion of blacks reclassify themselves over time, the distinction between black and brown is highly unstable compared to the dichotomy of white and Afro-Brazilian. Third, evidence of reclassification strongly suggests that over time comparisons that treat blacks and browns as separate categories are subject to selectivity bias given the likely association between reclassification and upward mobility. Finally, if nuanced color distinctions are important to studies of horizontal race relations, the dichotomy of white and Afro-Brazilian is more pertinent to analyses that focus on racial inequality and vertical race relations. These observations provide compelling reasons to collapse the brown and black census categories into a single Afro-Brazilian designation in analyses of color differences in mortality.

#### CONCEPTUALIZING COLOR, CLASS, AND CHILD MORTALITY

The probability that children will live to see their fifth birthday is a robust indicator of a population's quality of life. Variables such as income, education, and nutrition can be thought of as inputs to people's standard of living. The child mortality rate, in contrast, is an outcome measure that reflects the combined effects of a host of variables, each operating through different mechanisms and interacting with one another to determine the likelihood of death in the early years of life. Mortality among children is therefore the cumulative consequence of multiple processes and is only infrequently the result of a single disease episode (Mosley and Chen 1984). The literature on the covariates of child mortality is extensive and complex, but the central point that deserves attention is that the probability of death is a summary indicator of a population's living and health standards. "The mortality rate," as Young, Edmonston, and Andes (1983, 66) put it, "is the bottom line of the social balance sheet."

Attempts to conceptualize the determinants of child mortality typically draw a distinction between the socioeconomic factors at work and the proximate pathways through which they affect child survival outcomes. The framework shown in figure 1 is derived from earlier models of the proximate determinants mortality advanced by Chen (1983) and Mosley and Chen (1984), as well as Hummer's (1996) more recent contribution, which incorporates racial disparities into the causal chain. The figure underscores the idea that socioeconomic factors do not influence mortality directly but, instead, operate through numerous proximate variables, including parental characteristics, health care, nutrition factors, infection factors, and environmental conditions.

The figure further makes explicit the idea that race influences both the socioeconomic and the proximate factors, and, therefore, child mortality,

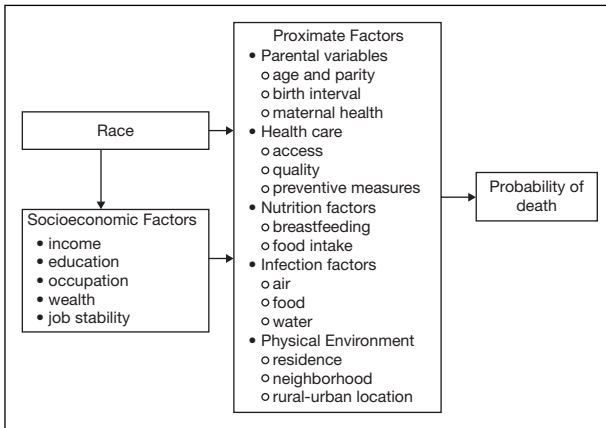


Figure 1 Socioeconomic and Proximate Determinants of Child Mortality

Source: Adapted from Hummer (1996), Chen (1983), and Mosley and Chen (1984).

albeit indirectly. As the data in tables 3 and 5 will show, Afro-Brazilians are at a disadvantage compared to whites in terms of the socioeconomic indicators noted in figure 1, especially with respect to wages they earn on the job, the occupations in which they are employed, and the wealth they are able to accumulate (see Telles 2004, especially chapter 5). Lower levels of educational attainment among Afro-Brazilians account for a substantial proportion of the color gap in income and occupational status, as expected in a competitive labor market. However, studies that decompose the color differential into separate dimensions show that labor market discrimination is also present. Even when individuals possess the same human capital endowments, Afro-Brazilians are denied access to better jobs (Arcand and D’Hombres 2004), and, once employed, earn less than their white counterparts (Arcand and D’Hombres 2004; Lovell 1994, 2000, 2006; Silva 1978, 1985).

Racial disparities are also associated with spatial distribution of the population. The historical legacy of the slave-based sugar plantations that once thrived in the Brazilian Northeast largely accounts for the contemporary concentration of Afro-Brazilians in less-developed regions of the country (Lovell 2006). Brazilians of African descent are similarly overrepresented in less desirable locations in the urban areas and in poorer neighborhoods in cities across the country. Low purchasing power relegates the poor to high-risk areas in the city regardless of color, but Afro-Brazilians are further disadvantaged by racism and discrimination in housing markets (Telles 2004, especially chapter 8). When Afro-Brazilians are disproportionately relegated to places with low access to health services and high environmental risks, spatial factors have negative consequences with respect to the proximate factors that determine child survival.

Data limitations mean that no single study is able to encompass the entire list of factors in figure 1, which, in any case, is illustrative rather than exhaustive. Nonetheless, by depicting the causes and pathways through which race and socioeconomic status influence child survival, the framework serves to organize and interpret our results, and it begins with estimates of the average number of years of life expected at birth among the white and Afro-Brazilian population from 1950 to 2000.

#### SKIN COLOR AND MORTALITY DIFFERENTIALS: 1950–2000

Conventional estimates of the death rate that rely on vital registration statistics are inaccurate in places like Brazil where births often go unreported, as do infant and child deaths. Brass and colleagues (1968) devised an indirect method of mortality estimation that uses census and surveys rather than vital registration data. The original Brass method, and more recent variants of the same approach (Brass 1981), is based on the simple observation that a mother's age is associated with the age of her children. Hence, the proportion of children surviving to mothers aged thirty to thirty-four, multiplied by a correction factor to account for the age pattern of fertility, yields estimates of the probability of death by exact age five, the  ${}_5^q$  life table value.

The  ${}_5^q$  estimate, in turn, can be converted into the number of years of life expected at birth, a readily interpretable number that reflects the quality of life of the white and Afro-Brazilian populations. The transformation is possible because in human populations the mortality at any given age is closely correlated with the level of mortality at all other ages, depending on the age pattern of mortality. When the age pattern of mortality is known, a complete life table can be constructed from a particular age-specific mortality rate, in this case the estimated  ${}_5^q$  value, using the logit transformation that Brass and colleagues (1968) propose. In this study, the Model Life Tables for Brazil (Instituto Brasileiro de Geografia e Estatística [IBGE] 1981) provided the age pattern of mortality for 1950 and 1960.<sup>4</sup> For 1980, 1991, and 2000, we used the respective life tables generated by the Brazilian Census Bureau (IBGE 2006).

Estimating life expectancy from child mortality rates assumes that the level of mortality in the early years is associated with mortality at older ages, a relationship that demographers have found to be robust (Coale and Demeny 1966). Descriptions of the procedures, including detailed examples of its application, can be found in Lingner (1974) and in chapter 3 of

4. Before we could estimate the  ${}_5^q$  values, we first had to adjust the data for the fact that the census questionnaires used in 1950 and 1960 did not distinguish between the number of live children ever born and the number of children born dead. To separate the two values, we used the model developed by Frias and Oliveira (1991).

Table 2 *Years of Life Expected at Birth by Color, Brazil, 1950–2000*

Year	Total (1)	White (2)	Afro-Brazilian (3)	Column 3 – 2 (4)
1950	44.7	47.1	40.5	-6.6
1960	49.5	53.7	44.1	-9.6
1980	62.5	66.0	59.3	-6.6
1991	66.9	71.1	63.6	-7.5
2000	70.4	73.8	67.6	-6.2

Source: Demographic censuses, various years.

the manual on indirect techniques of demographic estimation, published by the United Nations (1986). A distinct advantage of the indirect technique is that it can be applied to census data, which, unlike vital registration data, contain information other social indicators, including the color classification of the respondent.

#### *Average Number of Years of Life Expected at Birth*

For Brazil's total population, the average number of years of life expected at birth in 1950 was 44.7, a value comparable to that observed in other regions of the developing world at the time. Since then, life expectancy in Brazil has risen nearly 26 years, reaching 70.4 in 2000, as shown in table 2.

Separate estimates for whites and Afro-Brazilians reveal a persistent pattern of color inequality, even as mortality declined for the population as a whole. In 1950, the average expectation of life among the white population (47.1) exceeded that of the Afro-Brazilian population (40.5) by 6.6 years. In the decades between 1950 and 2000, the color gap reached a high of 9.6 in 1960 and fell to 6.2 years in 2000, only slightly less than the value observed fifty years earlier.<sup>5</sup>

To portray the striking increases in life expectancy that took place, figure 2 plots the estimated values over the past five decades. The lower portion of the figure, which displays the magnitude of the color disparity, shows that the mortality gap between whites and Afro-Brazilians, which averaged around seven years, remained remarkably stable from 1950 to 2000. It is evident that the overall standard of living has substantially improved in Brazil since 1950, yet the difference between the whites and Afro-Brazilians was about the same in 2000 as it was at midcentury. This finding reflects the stubborn persistence of racial inequality during a fifty-year period of rapid social, economic, and political change.

5. Disaggregation by color is based on the mother's self-classification and does not, therefore, account for the husband's race, which may differ from his wife's.

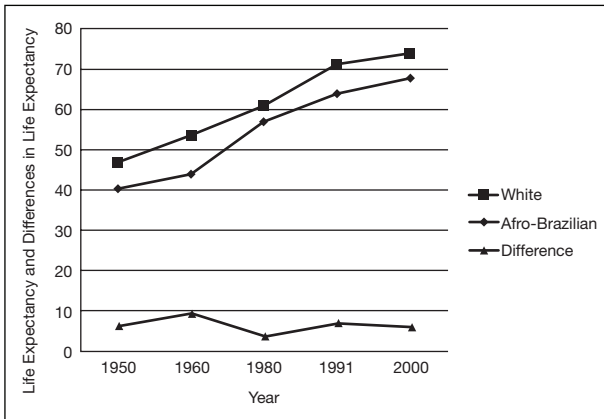


Figure 2 Life Expectancy by Color, 1950–2000

Source: Table 2.

The mortality decline in the second half of the twentieth century can be largely attributed to improvements in key social indicators registered during the period, as noted in table 3. Substantial improvements in education, income, and housing quality are evident in column 1. The 2000-to-1960 ratios, entered in each panel of table 3, show that the number of years of schooling completed by mothers and fathers were, respectively, 3.8 and 2.8 times higher in 2000 than they were forty years earlier. Similarly, household income saw a fourfold increase, from R\$257 in 1960 to R\$1,088 in 2000. Improvements of approximately the same magnitude were recorded in various indicators of housing quality, such as the percentage of dwellings with running water, sewage lines, and connection to the electrical power grid.

Columns 2 and 3 leave little doubt that the white population scores consistently higher than the Afro-Brazilian population on all six social indicators. The ratios presented in the right-most column further indicate that color differences in living standards were high in 1960 and that, since then, the Afro-Brazilian population experienced higher rates of improvement than whites did, causing the color differential to narrow considerably by 2000. The only exception is evident in estimates of average monthly household income. Because Afro-Brazilian households experienced lower income gains than white households (3.9 and 4.6, respectively), the income gap in 2000 was greater than the differential observed in 1960. The pattern of change from 1960 to 2000 is the same in each of Brazil's five major geographic regions (North, Northeast, Southeast, South, and Center-West), although the value of the indicators is generally higher in the South and Southeast than in the less developed North and Northeast regions.

Table 3 *Social Indicators by Color, Brazil, 1960, 1980, 2000*

		Year	Total	White	Afro-Brazilian	Column 2/3
			(1)	(2)	(3)	(4)
Mother's education <sup>a</sup>	(1)	1960	2.0	2.4	1.2	2.09
	(2)	1980	4.8	5.7	3.5	1.64
	(3)	2000	7.3	8.2	6.3	1.30
	(3)/(1)		3.8	3.4	5.4	
Father's education <sup>b</sup>	(1)	1960	2.1	2.5	1.2	2.02
	(2)	1980	4.1	5.0	2.7	1.84
	(3)	2000	5.8	6.7	4.6	1.45
	(3)/(1)		2.8	2.7	3.7	
Household income <sup>c</sup>	(1)	1960	R\$ 256	R\$ 300	R\$184	1.63
	(2)	1980	R\$860	R\$1,101	R\$515	2.14
	(3)	2000	R\$1,088	R\$1,387	R\$724	1.92
	(3)/(1)		4.2	4.6	3.9	
Running water <sup>d</sup>	(1)	1960	19%	26%	8%	3.25
	(2)	1980	54%	63%	41%	1.54
	(3)	2000	75%	79%	70%	1.13
	(3)/(1)		3.9	3.0	8.8	
Sewage line <sup>d</sup>	(1)	1960	12%	16%	4%	4.00
	(2)	1980	25%	34%	14%	2.43
	(3)	2000	47%	52%	41%	1.27
	(3)/(1)		3.9	3.3	10.3	
Electricity <sup>d</sup>	(1)	1960	38%	47%	22%	2.14
	(2)	1980	70%	80%	56%	1.43
	(3)	2000	94%	97%	91%	1.07
	(3)/(1)		2.5	2.1	4.1	

Source: Microdata samples, demographic censuses 1960, 1980, 2000.

<sup>a</sup>Mean years of schooling completed, women between twenty and thirty-four years of age.

<sup>b</sup>Mean years of schooling completed, men in consensual unions or married (religious, civil, both) to women between twenty and thirty-four years of age.

<sup>c</sup>Sum of monthly income of all household members (households with women between twenty and thirty-four years of age) are constant values, expressed in reales in 2000. The minimum wage in 1960 was R\$227.10; in 1980, R\$194.30; in 2000, R\$151.00.

<sup>d</sup>Dwelling unit connected to service line.

Improvements in living standards shown in table 3 undoubtedly account for the decline in infant and child mortality and the associated increase in life expectancy, as they operate through the proximate factors noted in figure 1. But the cross-tabulations presented in table 3 reveal nothing about the relative magnitude of the mortality-reducing effect of each indicator. Nor do the tabulations indicate whether the color differences in income, education, and housing quality fully account for

the higher mortality among children born to Afro-Brazilian mothers. To address these issues, we apply a multivariate statistical technique to the individual records sampled from the 1960, 1980, and 2000 demographic censuses to estimate the separate mortality reducing effects of the socio-economic and proximate factors for which we have measures.

### *Socioeconomic and Proximate Determinants of Child Mortality*

Using individual women aged twenty to thirty-four with at least one live birth as the unit of analysis, the total number of children dead is treated as the dependent variable. The latter is given by the number of live children ever born minus number of children surviving at the time of the census, for each woman in the sample. The independent variables in the analysis are the indicators noted in table 2. Whether the woman's dwelling has running water, a sewage line, and electricity are treated as dummy variables, coded 1 if the attribute is present and 0 otherwise. Similarly, place of residence is dummy coded such that 1 is urban and 0 is rural. The human capital available in the household is given by the mother's educational achievement and the educational achievement of her spouse, to whom she is connected by marriage (civil or religious) or consensual union. The estimate of household income was generated by summing the income earned for all individuals within the household and then appending the summed value to each woman's record.<sup>6</sup> Finally, Afro-Brazilian mothers (women who declared themselves preto or pardo) are coded 1. White mothers, coded 0, are treated as the reference category for the color variable.

Because the dependent variable is a count of the number of dead children, negative binomial regression is the appropriate statistical technique (Bawah and Zuberi 2004; Gardner, Mulvey, and Shaw 1995). To control for fertility and the duration of exposure, the number of children born to each woman is included as an offset, along with the mother's age. The model is estimated using maximum-likelihood procedures. Table 4 presents the results of negative binomial regression models for 1960, 1980, and 2000. The coefficients in columns 1, 3, and 5 show the effect of each independent variable on the predicted count of dead children. To facilitate interpretation, the coefficients are converted into estimates of the percentage change in child mortality associated with each indicator, as noted in columns 2, 4, and 6. When the independent variable is dummy coded, the coefficient is interpreted as the effect of that variable relative to the excluded reference category. When the independent variable is continuous, the coefficient

6. We used means substitution to deal with missing data, a method that does not change the regression coefficient. Although means substitution can influence the standard error of the coefficient by virtue of adding cases but no additional information, this is less of a problem when the sample size is large and proportion of missing values is small, as is the case here.

Table 4 Children Dead among Children Born to Women 20–34 Years of Age, Regressed on Selected Social Indicators, 1960, 1980, 2000 (Negative Binomial Regression)

	1960		1980		2000	
	b (1)	Percentage change (2)	b (3)	Percentage change (4)	b (5)	Percentage change (6)
Color						
White	(ref)		(ref)		(ref)	
Afro-Brazilian	0.0732	7.6	0.09945	10.5	0.1214	12.9
Place of residence						
Rural	(ref)		(ref)		(ref)	
Urban	.2111	23.5	0.31887	37.6	0.2390	27.0
Age (in years)	0.0197	2.0	0.00012	0 <sup>ns</sup>	0.0214	2.2
Mother's education <sup>a</sup>	-0.0882	-8.4	-0.07142	-6.9	-0.0619	-6.0
Father's education <sup>b</sup>	-0.0467	-4.6	-0.03193	-3.1	-0.0368	-3.6
Household income <sup>c</sup>	-0.0004	0.0	-0.00001	0 <sup>ns</sup>	-0.0001	-0.1
Housing						
Running water <sup>d</sup>	-0.1527	-14.2	-0.15021	-13.9	-0.1636	-15.1
Sewage <sup>d</sup>	-0.1017	-9.7	-0.15514	-14.4	-0.0539	-5.3 <sup>ns</sup>
Electricity <sup>d</sup>	-0.0731	-7.1	-0.02162	-2.1 <sup>ns</sup>	-0.0095	-0.9 <sup>ns</sup>
Region						
North	(ref)		(ref)		(ref)	
Center-West	-0.3366	-28.6	-0.0405	-4.0 <sup>ns</sup>	-0.3786	-31.5

Northeast	(14)	0.3331	39.5	0.4646	59.1	0.1946	21.5
Southeast	(15)	-0.0337	-3.3 <sup>ns</sup>	-0.1623	-17.6	-0.2728	-23.9
South	(16)	-0.1552	-14.4	-0.0770	-7.4 <sup>ns</sup>	-0.2965	-25.7
In alpha		-1.29514		1.120778			1.060603
No. observations <sup>e</sup>		66,886		69,181			61,462

Source: Microdata samples, demographic censuses 1960, 1980, 2000.

<sup>a</sup>Mean years of schooling completed, women between twenty and thirty-four years of age.

<sup>b</sup>Mean years of schooling completed, men in consensual unions or married (religious, civil, both) to women between twenty and thirty-four years of age.

<sup>c</sup>Sum of monthly income of all household members (households with women between twenty and thirty-four years of age), standardized to the currency value in 2000.

<sup>d</sup>Dwelling unit connected to service line (yes, coded 1; no, coded 0).

<sup>e</sup>Sample excludes women with no live births.

refers to the mortality effect associated with each increment in the value of the independent variable.<sup>7</sup>

The findings provide unique insights into the relative importance of the covariates of infant and child mortality. In 1960 and subsequent years, mortality-reducing effects were strongly associated with the presence of running water in the home. Other things being equal, running water reduced the predicted count of dead children by 14.2 percent (row 9, column 2). Similar reductions were associated with the presence of sewage lines (-9.7 percent) and connection to a supply of electricity (-7.1 percent).<sup>8</sup> Access to water and sewage disposal continue to be associated with lower mortality in 1980 and 2000.

Lower child mortality is strongly associated with the number of years of schooling that parents have completed. The mother's educational achievement is particularly important. For every additional year of school completed (row 6), the predicted count of children dead is reduced by 8.4 percent in 1960 (column 2). The effect of maternal education was -6.9 in 1980 and -6.0 in 2000 (columns 4 and 6). The father's education level is not unimportant, but in all three time periods, it exerted an effect that was about half the magnitude of the effect of the mother's educational attainment.

The coefficients presented in row 4 further show that place of residence strongly influences the level of mortality. When we compare the results over the three time periods, it is evident that, net of the effects of the other variables in the equation, urban living was associated with higher mortality in 1960 (23.5 percent), 1980 (37.6 percent), and 2000 (27 percent). The increase in the urban effect from 1960 to 1980 may have been caused by the fundamental transformations that took place during the second half of the twentieth century in the geographic distribution of the Brazilian population and the effect of that migration on the country's urban ecology. Analyses of the rural exodus between 1960 and 1970 put the number of net rural-to-urban migrants at around 13.7 million people (Wood and Carvalho 1988). Hyper-urbanization was associated with a surplus of job seekers, leading to the rapid growth of teeming favelas located in high-risk peripheral zones of burgeoning urban centers (Monteiro 2004; Pasternak 2002).

If color differences in the various social indicators accounted for all of the variation in mortality, the coefficient for the color dummy variable, shown in row 2, would be statistically insignificant. The results show

7. In the negative binomial model, a one-unit increase in  $x_{ij}$  multiplies the expected number of incidents by a factor of  $\exp(B_j)$ .

8. We enter the housing-quality variables into the equation recognizing that the indicators play a dual role. Each has a direct effect on child mortality (as an intermediate factor) and an indirect effect as a proxy measure of socioeconomic standing (see Bawah and Zuberi 2004).

otherwise. In 1960, being Afro-Brazilian was associated with a level of child mortality that was 10.1 percent higher than that of white children. In 1980, the comparable figure was 10.5 percent, and it was 12.9 percent in 2000. The continued statistical significance of the color variable indicates that additional social indicators beyond those included in the equation account for the remaining color differences in child mortality.

Other data sources give us an indication of what those additional variables might be. The indicators in table 5, for example, show a systematic white advantage with respect to various proximate factors, including the proportion of women who reported having a gynecological examination in the previous year, and the proportion who indicated that a health problem impeded their normal activities sometime during the previous two weeks. Similar differences are evident with respect to access to health coverage, the density of persons per bedroom, and the stability of employment in the labor force, one of the variables listed under socioeconomic factors in figure 1. The absence of a data set that contains all of these variables means that we are unable to estimate the separate effects of each indicator using multivariate statistical techniques. The disparities noted

Table 5 Indicators of Color Inequality

		White	Afro-Brazilian
Health	Percentage with health coverage <sup>a</sup>	33.8	15.4
	Percentage gynecological exam <sup>b</sup>	33.7	21.5
	Percentage with a health problem <sup>c</sup>		
	Women	6.4	7.8
Men	4.9	5.5	
Housing	Density <sup>d</sup>	6.5	13.6
Employment	Percentage in precarious jobs <sup>e</sup>		
	Women	33.5	46.8
	Men	30.9	45.8

<sup>a</sup>Women between fifteen and forty-nine years old; Pesquisa Nacional por Amostra de Domicílios 1998.

<sup>b</sup>Sociedade Brasileira de Bem-Estar da Família, Pesquisa Nacional Sobre Demografia e Saúde (PNDS).

<sup>c</sup>Percentage who indicated that a health problem impeded their normal activities during the previous two weeks; Pesquisa Nacional por Amostra de Domicílios 1998.

<sup>d</sup>Average number of persons per bedroom; demographic census 2000.

<sup>e</sup>Workers who did not have a work card (*carteira de trabalho*) and who were own-account workers (*por conta própria*); demographic census 2000.

in table 5 nonetheless point to the multiple dimensions along which color inequality is expressed.

#### REFLECTIONS ON THE PROSPECTS OF COLOR EQUALITY

In an era in which racism has become the subject of public debate and policies to reduce racial inequality are being considered, the implications of our results for the prospects of achieving color equality in Brazil assume special relevance. The large color differentials between the white and the Afro-Brazilian populations in terms of the average number of years of life expected at birth are especially revealing. Using census data from 1950 to 2000, we showed that both groups experienced an increase in length of life of around twenty-five years. But the general improvement in living standards did not lessen the magnitude of the difference between the two populations, which remained virtually unchanged for five decades. That the color differential in length of life averaged around seven years during this important period in Brazil's history speaks to the stubborn persistence of racial disparities in the face of profound social, economic, and political change.

Our analysis of sample data randomly drawn from the 1960, 1980, and 2000 census enumerations confirmed that child mortality rates were highly sensitive to socioeconomic measures, such as household income, parental education, and housing quality. To interpret the results, we developed the conceptual framework depicted in figure 1, which identifies the various pathways through which socioeconomic factors, color inequality, and racial discrimination produce the observed racial disparities in life chances. The framework underscores the idea that improvements in socioeconomic indicators do not reduce child mortality directly but only insofar as they operate through one or more of the proximate determinants of child survival.

Results of the multivariate analysis carried out at the individual level show that standard socioeconomic measures tell only part of the story, as other factors are also at work. The conclusion that additional factors play a role is evidenced by the continued statistical significance of the color variable, even after introducing controls for income, education, and housing quality. The proportion of variance explained by the color variable rose to 12.9 percent in 2000, up from 10.5 percent twenty years earlier. The variance in child mortality explained by the color variable reflects the effects of other dimensions of socioeconomic and health status not included in the equation. Although the limitations of census data prevent us from identifying what those additional variables might be, the indicators shown in table 5 point to color disparities in the health status of mothers, access to health coverage, housing density, and the stability of employment. The findings suggest that achieving the goal of color equality in child mortal-

ity in the future will depend on the elimination of racial discrimination and on reaching parity with respect to the socioeconomic and proximate factors that determine the probability of child survival.

Race-based affirmative action policies that set out to redress unequal access to higher educational training by conferring compensatory advantages to Afro-Brazilians have the potential to reduce racial disparities in living standards. However, when we turn to the relationships depicted in figure 1, it is evident that the causal mechanisms involved are complex and operate only in the longer term. The goal of university-based affirmative action policies is to increase the educational opportunities of Afro-Brazilians and thereby increase their stock of human capital. In the absence of labor market discrimination, the increase in human capital is assumed to have a positive effect on income, occupational status, job stability, and wealth accumulation. Improvements of this kind will presumably have a favorable influence on child health to the extent that the effects of the various advances operate through the variables that comprise the proximate factors: parental characteristics and health care, as well as nutrition, infection, and environmental factors. Because affirmative action initiatives have yet to benefit a large number of people, and given the long time horizon required for the causal relationships to play themselves out, it will likely be years before the effects of such policies manifest.

Although the merits and feasibility of affirmative action tend to drive current debates about how to redress color inequality, other initiatives may be more important in the short run, notably the various activities consolidated under the Bolsa Família conditional cash transfer (CCT) program. Bolsa Família provides payments to the poor on the condition that children are immunized against infectious diseases and that breast-feeding mothers and pregnant women make regular visits to health centers (Hall 2008; Soares et al. 2006). By increasing a household's purchasing power and by providing an incentive for people to alter their health-seeking behavior, Bolsa Família has a potentially positive effect on various proximate determinants of child mortality shown in figure 1, such as maternal health, preventive measures, and nutrition. By virtue of the high concentration of Afro-Brazilians in the lowest income strata, it is plausible to expect that Bolsa Família, even though it is not an explicitly race-based program, has the potential to reduce racial inequality.

It is the premise of this study that the probability of death in the early years of life, because it reflects the combined effects of the various inputs to standard of living, is an output variable that serves as an especially robust indicator of a population's quality of life. The estimates of the magnitude and covariates of disparities in mortality between the white and the Afro-Brazilian populations during the second half of the twentieth century provide empirical benchmarks against which to monitor the progress toward color equality in the new millennium.

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