Racial and Gender Differences in the Health of Older People (60+) in Brazil

Susan De Vos
Luisa Schwartzman
Center for the Demography of Health and Aging
Department of Sociology
University of Wisconsin-Madison
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ABSTRACT

This paper examines racial and gender differences in health among elderly (60+) people in Brazil using 1998 national household survey micro-data (PNAD). Despite the possible inherent contradictions of doing so, we find that the health (more literally functional ability) of Black and Brown elders, or of elderly women, is not as good as the health of elderly Whites or men. Furthermore, it appears that Black-White differences can be explained by socioeconomic factors but that gender differences cannot be, and that Brown-White differences reverse when socioeconomic factors are controlled. In the process of this exploration, we delve into issues of comparatively indicating health and of imputing marital status. Although we found no evidence that there is an additional health disadvantage to being Black or Brown ***and*** *female, we strongly urge future health research to consider gender and socioeconomic differentials together rather than only separately, as is usually the case now.*

INTRODUCTION

This paper describes racial and gender differences in health among elderly (60+) people in Brazil. This could make sense if one considers the fact that being female and being Black or Brown usually carries with it a double disadvantage. That certainly is the case regarding such issues as income or employment opportunity in Brazil (e.g. Lovell, 1998, 2000). But regarding health, looking at race and gender together might seem a contradiction. Yes, what little we know about racial differentials in mortality or life expectancy suggests that mortality is higher, life expectancy lower, among Blacks and Browns compared to Whites in Brazil (Cunha, 1997; Wood and Lovell, 1992). But mortality may actually be lower, life expectancy higher, among women compared to men. (One can find recent Brazilian life tables by sex but not by race on the Web at ftp://ftp.ibge.gov.br/Tabuas_Completas_de_Mortalidade/.) Despite all the uncertainty and possible contradictions however, we will argue based on national survey data of surviving elders, that the health (more literally 'functional ability') of Black and Brown elders, and the health of elderly women, is not as good as the health of Whites or of elderly men. Furthermore, it appears that Black-White differences can be explained by standard socioeconomic factors but that gender differences cannot, and that Browns actually have better health than Whites once education is controlled. As far as we can tell, there is no additional disadvantage to being Black or Brown **and** female among Brazil's elders over what one might expect from each disadvantage alone.

Intuitive reasoning and questioning regarding the situation in most developing countries usually cannot be addressed empirically because of a lack of data: Except for some information on infant mortality, most mortality information, let alone race-specific mortality information has not been reported in any systematic manner. Except for the Demographic and Health Survey that focuses on women of childbearing age and their resident children, questions that could help assess health are generally not included in surveys that often emphasize short-term economic issues to the exclusion of other topics. Extraordinarily, Brazil's periodic national household survey (PNAD) in 1998 appended a special module oriented toward health and health care, enabling us to look at the health of older survivors in a developing country, in conjunction with such standard demographic information as their age and sex, and in conjunction with such geographic, household and socioeconomic information as their region of residence, source of water used by the household, household size, household income, and education.

Thus in addition to describing a racial and/or gender difference in health in Brazil, the study attempts to push a truly international view of demographic and health research. But doing so is not straightforward even with the existence of nationally-representative data. For instance, the data make it all the more glaring that we do not yet have good comparative indicators for health despite the mammoth efforts of the World Health Organization. Consequently, we need to devise a measure from survey questions that could have comparative value. Hopefully, in the future our measurement attempt will be seen as early and crude but still informative. For another example, the 1998 PNAD shares with some recent or current surveys such as the DHS the unfortunate quality of having neglected to gather basic information on marital or union status. Since we consider such information essential for our demographic and sociological study, we construct an imputation algorithm using household information, a procedure that appears to work quite well.

The remainder of this introduction is devoted to brief discussions of health, aging and development in Brazil, race and health in Brazil, and gender and health in Brazil. Then we turn to our particular empirical contribution that utilizes distinctive national survey data collected in 1998. The empirical study involves describing those data, discussing a scale of functional ability, a discussion of imputing marital status, and a discussion of our multivariate model. Finally, we discuss the findings, some of their implications, and suggest possible avenues for future research.

Health, Aging, and Development in Brazil

Brazil is a 'lower middle' income, developing country, although there exist extreme differences within the country itself. Average per capita purchasing power in 1998 was $6,460, a rank of 80th in the world (U.S. Census Bureau, 2000: Table 1364). General life expectancy at birth, 68.3 years in 2000-2005, is lower than the average for Latin America and the Caribbean of 70.4, but higher than the world average of 66.0 (U.N., 2002: 49, 89, 153). Without entering into a debate about why this may be the case, it is nonetheless a fact that Brazil's average life expectancy at birth has been increasing, and is projected to increase still further. In 1950-1955, it was about 50.9 years, increasing to 61.5 in 1975-1980, 68.3 in 2000-2005, and a projected 73.9 in 2025-2030 (U.N., 2002a: 153). It should be no surprise therefore that Brazil's population proportion 60+ has been increasing: While it was a little less than 5 percent of the population in 1950, by 2000 it was almost 8 percent, and by 2025 is estimated to be over 15 percent (U.N., 2002; a decline in fertility is also partly responsible for this). Again, although the last figure may appear astounding, it is in fact fairly typical for a Latin American country.

Although most people continue to stay relatively healthy into old age, average health does tend to decline with age, and the older population tends to have more physical limitations than younger people (see Lima-Costa et al., 2002). This has led people to estimate 'health-adjusted life expectancy' or HALE (what formerly was called disability-free life expectancy or DALE) as opposed to regular life expectancy. Brazil's HALE in 1999 is estimated to have been only 59.1, a difference of almost 10 years from the regular life-expectancy figure (Mathers et al., 2001). Thus it is theoretically possible for full life expectancy to increase even while actual disability-free life expectancy stays the same, a phenomenon that appears more likely in developing countries than in developed ones. The Brazilian situation is unknown because there are yet to be trend data. Healthier survival may involve a life style, dietary habits, and/or an increased use of ever-more modern medical technology and drugs.

In addition to a figure such as life expectancy at birth, a comparison over time in a figure such as life expectancy (or number of years left) at age 10 or age 60 could be very informative. Unfortunately, those figures for Brazil have only been available since about 2000. But other indications of change are the proportion of all deaths that occur to elders, and what the main causes of death are. In general, the lower the mortality at young ages, the larger the proportion of all deaths that occur at older ages. Kinsella and Velkoff (2001: 38) can report that circa 1995 about 43 percent of Brazil's mortality occurred to people aged 65 and above, compared to 73 percent in the U.S. and 34 percent in Nicaragua (where e^o was about 69 in 2000). Since infant and child deaths tend to be caused by communicable diseases whereas elderly deaths tend to be caused by noncommunicable, chronic and degenerative diseases, it is noteworthy that the proportion of deaths due to conditions originating in the perinatal period, acute respiratory infections and intestinal infectious diseases declined dramatically between 1980 and 1994 while the proportion of deaths due to malignant neoplasms (cancer), cerebrovascluar disease (e.g. heart attacks and strokes) and other such afflictions increased substantially (Pan American Health Organization, 1998: 61).

Race and Health in Brazil

Similar to the United States, Brazil has a history of colonization and slavery which brought peoples from Europe, Africa and the Americas (and to a lesser extent, Japan and the Middle East) together, though it is generally agreed that Brazil imported many more black Africans than did North America (Smith, 1972; Oliveira, 1996). This encounter was in no way equal or peaceful, bringing genocide to much of the indigenous population and an extreme exploitation and subjugation of Africans and their descendants, followed by much intermixing of these populations, often under questionable circumstances (e.g. Diaz and Stewart, 1991). Similar to what happened in the U.S. and in other colonial societies, Brazil developed in the 19th century a racial classification system consistent with the dominant ideology of the time that human beings from different geographical areas and who were different in some aspects of physical appearance belonged to distinct races. However, contrary to the U.S., where the mixture of those "races" was regarded as undesirable and where "mixed-race" people were deemed equivalent to "blacks," Brazilian elites, worried about the future of a nation where most people were of African descent, devised a new perspective whereby "African blood" was supposed to be improved when mixed with "European blood," creating a more adapted, more authentically Brazilian and more "white" population, which they hoped would turn progressively whiter as more immigrants from Europe arrived. Thus, to document the "whitening" of the population, the category "pardo" (an intermediary betwee black and white, which we translate here as Brown) was created (Skidmore, 1995). This old-fashioned thinking no longer provides a rationale for this racial classification, and in fact, the Brazilian Census's term for Brown (*pardo*) is rather artificial and is rarely used outside of statistical functions. Currently, many so-called *pardos* would actually prefer *moreno* – a loose category that can mean sun-tanned, brunette or be a euphemism for black or mulatto.)[1] Historical studies show the importance of the "mulatto" category during slavery, a category that had meaning and that gave people an intermediary social position (see Degler, 1986). Also, there has been a long-standing debate on whether ordinary Brazilians understand race as continuous or dichotomous categories (see Guimaraes 1999 for a review), and thus having an intermediary category between black and white is useful in order to assess this claim. According to the recent census of 2000, 53.8 percent of the population was White, 39.2 percent Brown (or mixed), 6.1 percent Black, 0.5 percent Yellow and 0.4 percent Indigenous.

Brazil's racial categories are important because the society is highly stratified, and Blacks and Browns are more likely than Whites to be among the poorest and most disenfranchised. Since information on race has become available (it was barred from the 1970 Census) it has been clearly shown that Blacks and Browns receive poorer education, have a harder time obtaining employment, and get paid less for the same work than White counterparts (Lovell and Wood, 1998: 91; see also Cunha, 1994; Henriques, 2000, 2001; Reichmann, 1999; Silva, 1999; Silva and Hasenblag, 1999). It is no surprise therefore that we found elderly Blacks to have a lower functional ability (average of 4.95) than Browns (average of 5.12) who in turn had lower functional ability than Whites (average of 5.31). See Table 1.

As of the late 1990s, Brazil's central statistical agency had begun to construct life tables, not only for the general population but also for males and females. Unfortunately, but hardly unusually, that construction did not extend to racial groups as it does, for instance, in New Zealand.[2] Still, Cunha (1997:229) was able to report from special tabulations that the age-specific survivorship among females was higher for Whites than for either Blacks or Browns for every five-year age group between 45 and 75 in 1980.

Mortality among infants and young children, by the race of the mother, is better known. Cunha (1994) could report that 1983 Brazilian infant mortality rates were estimated to be 69 per thousand among Blacks, 67 per thousand among Browns, and 40 per thousand among Whites. In the Northeast region it was 111, 98, and 70. Wood and Lovell (1992) performed a rather sophisticated analysis of child mortality to report that *Tobit regression analyses of sample data for metropolitan areas in 1980 found that race of mother continued to have a significant effect on child mortality after controlling for region, household income and parental education*.

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[1] It is worth noting that "cultural" explanations or "group behavior" explanations are unlikely to apply in Brazil because race does not seem to be a big element in identity formation or a sense of "groupness." It actually may be common for people to be of different "races" or "colors" in the same family.

[2] In New Zealand, the its Ministry of Health estimated various mortality indicators for different racial and gender groups over the last half-century (Ajwani et al., 2003).

A main question addressed by this study is whether racial differences in health can be explained away by socioeconomic factors or whether there is something else, such as discrimination, working as well. In a recent study of the situation in the United States, an effect of race **did** appear to persist after controlling for many socioeconomic factors although the authors of that study also stressed the *impact of wealth on premature adult mortality* (Huie et al., 2003). In Brazil, the question is complicated by the fact that race is related to socioeconomic status in a way that seems strange in the United States: it is assessed through looks rather than ancestry, and much of the literature stresses the fact that socio-economic status may influence the way people classify themselves and are classified. That is, someone with the same physical appearance may be considered lighter if he/she has money. Also, someone considered Black or Brown in one situation might be considered Brown or White in another or vice versa. Finally, if a darker parent could have a light skinned child or vice versa, the child and the parent could be classified differently.

Curiously, recent research suggests that a difference in Brazil may not be robust if it exists although that research leaves us with at least as many questions as answers. For instance, in an investigation of childhood stunting, Burgard (2002) found a difference by mother's race to be explained by background (e.g. biological and demographic) as well socioeconomic factors, but we do not know which ones. Items such as a child's age (in months) and the mother's own height were controlled at the same time as were mother's and father's education, household wealth (proxied by household resources), urban/rural residence and region of the country. Did the background factors alone explain the racial difference? If not, what factors did? Another study, using the same data set that we use here, examined self-rated health (very good, good, okay, poor, miserable) among people of all ages (Dachs, 2002). Although the study found racial differences in self-rated health, it did **not** find those differences to persist once demographic and socioeconomic factors were controlled (e.g. age in groups of years, sex, years of education, per capita income and urban/rural residence). Dachs's conclusion? That socioeconomic status, not race, was the main cause of differences in health. Maybe so, but the problem is that this ambitious study leaves itself open to many criticisms, some of which could render the findings meaningless.[3] While we also look for the persistence of racial differences after controlling for other factors, we do so using a better-defined measure of health (functional ability), focus on only one age group that has furthermore completed its education (elders), use per adult **household** income, and assess statistical significance with independent observations (using only one observation per household). That is not all, as the discussion below suggests. But first, let us discuss the issue of gender and health in Brazil.

Gender and Health in Brazil

There are many indications that Brazilian society has been 'developing,' from a perusal of the per capita Gross National Product (US$2,780 in 1990 and US$3070 in 2001; U.S. Census Bureau, 2003) to estimates of its infant mortality rate (73.7 per 1000 in 1980, 49.9 in 1990 and 35.2 in 2000), to estimates of its life expectancy at birth (62.5 in 1980, 67.0 in 1990, and 70.3 in 2000; U.S. Bureau of the Census, International Data Base Table 10, last updated July 17, 2003). However, just as this progress has not been experienced equally by the different racial "groups," so too has a *rich body of literature on gender differentials [has] consistently demonstrated that Brazil's prevailing style of uneven economic development does not favor the equitable incorporation of women into society* (Lovell, 2000: 89).

So when it comes to health, there is an apparent paradox because Brazilian females appear to have a higher rate of survival than Brazilian males, but at the same time they have poorer health. Consider the following: In 1998 in Brazil the expectation of life at birth for males was around 63 years compared to over 71 years for females (United Nations, 2003: 146). Yet when demographers at the World Health Organization distinguished between healthy life expectancy (HALE) as opposed to regular life expectancy, they estimated that the female-male gap in HALE in 2000 (4.1 yrs.) was much less than the gap in overall life expectancy at birth (7.4 yrs.) (Mathers et al. 2001: 51). Idler (2003) could say that women in general tend to live longer but rate their health more poorly. We find this to be true among the elderly population 60+ in Brazil in 1998 as

[3] For instance, how can you control properly for the education of people who had not entered school, let alone had not finished school? How can you treat the income of males and females as equal? How does on measure the level of a child's income? What would happen if one took account of the fact that there is a relationship between age group and education, that they are not independent? What would happen if the members of the same household were not assumed to be independent observations?

well, both in terms of self-rated health and in terms of functional ability. Average male functional ability was 5.76 compared to 4.81 for females. Table 1.

A major question, similar to the one we pose regarding racial differences, is whether the gender difference can be explained by such structural factors as income and education. The question is important regarding certain policy suggestions that would reduce the inequality of which Lovell so articulately shows us. However, the answer is probably 'no'. In a nice although dated evaluation of scholarly research on the issue up until then, Verbrugge (1985: 156) avers that "sex differences in health are principally the outcome of differential risks acquired from roles, stress, life styles, and preventive health practices." She subsequently found empirical support for some of the ideas in Detroit, Michigan (1989). Her suspicions are also consistent with Luy's clever study of cloistered populations in Bavaria compared with the general German population in which he found reason to suspect that most, but not all, of a sex differential in mortality was probably due to lifestyle rather than biological factors (2003).

Not everyone agrees with idea that socio-economic factors cannot explain the sex difference in health however (e.g. Arber and Cooper, 1999; Hraba et al., 1996; MacIntyre et al., 1996) although in Brazil, Dachs (2002) found that females tended to be much more likely to report bad health than males, after controlling for age, per capita (household?) income, education and urban/rural residence (but there are reasons to be skeptical of his analysis; see also Pinheiro et al., 2002). Generally however, potentially useful studies only look at socioeconomic differentials within sex groups, not across sex groups (e.g. Denton and Walters, 1999), whereas we can look across the groups once we have a sample that uses only one observation per household, even for married elders (more below).

A further step would be to suspect that the gender difference itself differs by race. Minority women can suffer triple disadvantage by being elderly, Black or Brown, **and** female, but is there reason to think that the status of women compared to men of the same race is different among White, Brown or Black women in Brazil? Yes. Though both men and women of darker skin color are more likely to have been confined to low-skilled, low-paying occupations during their lifetime, the nature of those occupations may differ in the risks to health they provide. For example, being a construction worker - a low-skilled male occupation - may have different consequences for health in old age compared to being a domestic servant - a low-skilled female occupation. Also, men of darker color are more likely targets of police violence (Mitchell and Wood, 1999). We could thus expect Black men to be less healthy than Black women even as the opposite were true for Whites and probably Browns. We failed to find an interaction between race and gender however. But that is jumping ahead again. Let us describe the study before discussing this further.

THE STUDY

DATA

This study uses a nationally-representative sample of elderly Brazilians 60 years and older from the 1998 national household survey *Pesquisa Nacional por Amostra de Domicilios* (PNAD). PNAD is a large survey administered yearly by the Brazilian Census Bureau (*Instituto Brasileiro de Geografia e Estatística* or *IBGE* [http://www.ibge.org/]; see also Silva et al., 2002). It is similar in many ways to U.S Labor Department's *Current Population Survey* (CPS). Each PNAD collects information from over 100,000 households and 300,000 individuals, and includes a permanent set of socioeconomic questions on such topics as age, sex, education, work status, earnings, fertility, household quality and household composition. Periodically, the survey contains extra questions on such topics as nuptiality, health, migration, nutrition, and social mobility. The 1998 PNAD added a health module.

People who were 60+ in 1998 had survived up to that point, and were thus a select group, by definition unrepresentative of their birth cohort. As Arber and Ginn observe (but the reader should substitute race and/or gender for class; 1991:120): *Because of selective survival we would expect class differences in morbidity and mortality to narrow with advancing age. Such selective effects are exemplified by the 'racial cross-over' found in the United States (citations). Blacks over age 75 have a lower mortality rate than whites because of the higher mortality of blacks in adulthood and among the 'young elderly.' This results in very elderly blacks being healthier than whites of the same age.* If we find suspected racial and/or gender

differentials to exist among Brazilians who actually reached age 60 in 1998, then we are in a strong position indeed.

The original data set with 28,943 person records of everyone 60+ was modified in several ways. First, our final data set only includes people recorded as White, Black or Brown, more than 99 percent of the original sample. Second, since we use statistics that assume independent observations, we only use one observation per household, which we selected randomly. Many elders were still married and in households with another elder, so we randomly selected a sample that was almost a quarter less than the original, 21,804. The random sample had very similar age and sex distributions compared with the original one. Third, we added household-level variables to a file that only had person records. For instance, we use household income, not personal income, and also use a household's water connection (more discussion on this below). Although the census office (IBGE) released person and household records in separate files, they could be merged because the households were allocated the same identification number in both files.

MODEL AND METHOD

The study's main question is whether and how such social structural characteristics as education or household income and such programmatic factors as having a health plan or having consulted a physician in the last 12 months might account for racial or gender differences in the health of older Brazilians. Unfortunately, causality cannot be addressed well in a cross-sectional study such as ours. Beside the fact that socioeconomic status may influence the identification of color, socioeconomic status may also be affected by health rather than the other way around. Similar reasoning applies to marital status, living arrangements, and whether someone resides in an urban or rural area. Thus, we use a multivariate model that predicts health given people's race and gender, controlling for response, demographic, geographic, socioeconomic, and health service factors. However, we will provide the reader with some speculation on what causal mechanisms we believe are likely to be operating. We use ordinary least squares regression because our indicator of health is a functional ability scale with nine units. We use the STATA software package, and its ability to perform OLS with categorical independent variables.

We use a step-by-step approach because this enables us to see how adding different controls affects racial and gender differences. In a first step, we just estimate a model in which our health indicator, Functional Ability, is regressed on whether the respondent answered the questions him/herself, race and sex. In a second step, we add controls for the demographic characteristics of age, marital status and independent living. In a third step, we further add controls for the geographic factors of region and urban/rural residence. In a fourth step, we even further add controls for the household/socioeconomic variables of water hookup, education and per adult household income. In a final step, we further add controls for health service and accessibility factors.

VARIABLES

Health

Since there is no accepted standard indicator of health, although many questions may be the same or similar, the major health indicator used in this study is a 9-point scale that summarizes answers to six questions about basic self-care and physical functioning (see McDowell and Newell, 1996; Spector, 1996; Stewart et al., 1992). We call it 'functional ability'. Although answers to constituent questions could range from 1=cannot do, 2=do with a little difficulty, 3=do with great difficulty, to 4=do without difficulty, we only summarized whether or not someone could perform the function without difficulty. The scale ordered the functions by the frequency with which people found it possible to perform the task without difficulty, and then assigned a score in a hierarchical manner; with one exception. People who had no difficulty with basic functions were allocated two points. Those who could perform basic functions with some difficulty were allocated one point. Those who were so severely limited as to not be able to perform basic functions at all

were allocated a zero (1.9%).[4] This arrangement was settled on because it could reflect more diversity than a bivariate measure (e.g. Rosa, 2003), other attempts at scaling seemed no better, and this method was at least straightforward and reproducible.

Although we cannot go into detail about the functional ability scale, we do show its zero-order distribution, for the total population and for each racial group and gender in Table 1. While not ideal, it is a reasonable indicator of functional ability. Almost a third (31%) of the population had no difficulty performing any of the seven tasks used to construct the scale. As can be expected, the proportion was higher for men (39%) than for women (25%), and for Whites (32%) than for Blacks (28%) or Browns (29%). Alternately, about 11 percent of the population had difficulty or could not do even the most basic of self-care tasks such as eating. Again, this was lower for males (9%) than for females (13%) and for Whites (11%) than for Blacks (12%) or Browns (12%).

A related, common way to indicate health is to simply ask people how they rate their health: very good, good, okay, bad or very bad. Indeed, many of the studies that have used the 1998 PNAD data have used the answer to this simple question, sometimes collapsing answers into a binary variable of good/not good or bad/not bad for the purpose of using binary logit regression (e.g. Dachs, 2002; Lima-Costa et al., 2002; Romero, 2002). Unlike other indicators that may only assess physical or mental health, the self-rating question allows the respondent to mix the two types of health and furthermore add a generally positive or negative outlook on life. As a result, a question on self-rated health may capture in a parsimonious way a host of factors, be well-correlated with other health indicators, and be a good predictor of mortality (Bailis et al., 2003; see also Schnittker, 2003 for a nice assessment). For instance, its correlation with our functional ability scale is 0.5. However, the self-rated health measure's strength is also a weakness: It has no precise external meaning and cannot be used to compare health across societies (see e.g. Angel et al., 2000; Zimmer et al., 2000).

Indeed, the problem of comparability across societies is an issue that plagues most health indicators except, perhaps, measures of severe disability captured by Katz et al.'s basic Activities of Daily Living that does not apply to many elderly people (see Guralnik and Ferucci, 2003; Liang and Jay, 1992). This is a major consideration for us because we want to be able to compare our findings for a developing country with findings for a developed country with a large racially-mixed population such as the United States. Answers to objective questions have a better chance at being comparable although the survey *asks about* the ability to perform a task rather than actually *observes* that it is performed, and one cannot be sure that the person can actually perform it (see Angel et al., 2000). To the extent that certain functions are culturally-defined as male or female tasks, there may still be a bias in the answer. In our data, we could not find a bias but there could still be one.

People did not always answer questions about their health themselves since one person in the household was often selected to respond to everything. Thus a little less than two-thirds of our cases were based on someone's own responses to questions regarding his or her own functional ability while almost a third of the respondents were other members of the household (in some cases [<4%] the respondent was not even another household member). Although respondents were heavily skewed toward females, respondents also tended to have better health. Table 1. Thus, who answered makes a difference and we always control for whether the **response** was for own functional ability or not.

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[4] (1) Difficulty eating, taking a bath or going to the toilet; (2) difficulty running, lifting heaving objects, practicing a sport or doing heavy work; (3) difficulty climbing an incline or flight of stairs; (4) difficulty bending or stooping; (5) difficulty walking more than a kilometer; (6) difficulty walking about 100 meters; (7) difficulty doing such domestic tasks as setting the table.

Then, the highest score on each of the functioning variables were assigned a value, in hierarchical fashion such that later ones subsumed earlier ones; in order of the frequency of the population having no difficulty performing the task:

1. First, cases in which there people could not perform even a basic function were allocated a score of 0.
2. Second, cases with no difficulty performing basic functions were allocated a 2.
3. Third, cases that had no difficulty walking 100 meters were allocated a 3 (meaning all those cases that had a 2 but also a 3 were pulled into category 3);
4. Fourth, cases that had no difficulty being able to do domestic chores were allocated a 4.
5. Fifth, cases that had no difficulty being able to walk a kilometer were allocated 5.
6. Sixth, cases with no difficulty crouching or bending were allocated 6.
7. Seventh, cases with no difficulty climbing were allocated 7.
8. Eighth, cases with no difficulty being able to carry/lift heavy objects or do heavy work were allocated 8.
9. Ninth, cases without a score but that had answered that basic functions could be done with difficulty were allocated 1.

Color or Race and Gender

To indicate race or color we rely on on responses to the question: "What is your [or whoever the respondent is responding for] race or color?"[5] Although there can be an important distinction between the concepts of race and color, we must here use the terms interchangeably given the question. We distinguish between White, Black and Brown (*pardo*). Although responses could be "indigenous" (*indígena*) or "yellow" (*amarelo*) as well, there were just too few cases in those categories (under 1% of the cases) for us to include them here.

Although we are mainly concerned with gender, gender being someone's social, not biological, self, we rely on the survey's question about sex.

Demographic Factors

On the individual level, we control for the demographic characteristics of age (among those 60+), living arrangements and marital status. Regarding **age**, people 60 and over ranged from 60 years of age to over a 100 years old. Not only do we deal with a huge biological range, but we deal also with a population that experienced different industrial, urban and epidemiological environments at different ages. Thus controlling for age at once controls for biological age, social period and birth cohort. Since recalling age is an imprecise exercise at best, we group the single years of age listed in the data file into quinquennial age groups up to 80 years of age. Everyone 80 and older is grouped into one category. Although health is known to decline with age, we treat age as a categorical, rather than a continuous, variable. We can see from figures in Table 1 that the average value of the functional ability scale goes from 6.02 among 60-64 year olds down to 3.46 among those 80 years and above.

Independent living is coded as a binary variable of yes or no based on information on household size and members's 'relation to household head'. People in households of size 1 were coded as living alone. People in households of size 2 in which there was a head and a spouse, lived in 'couple only' households. People who lived either alone or in 'couple only' households were living 'independently' while all others were classified as 'not independent' (Table 1). Not quite a third of our sample lived independently. Surprisingly, independent living had no relationship with functional ability by itself as both living independently or not living independently had mean functional ability scores of 5.22. We had expected that living arrangements would be related to health given past research on the subject (Hughes and Waite, 2002).

Marital status is perhaps the trickiest variable for us because, surprisingly, the survey did not gather this basic demographic information. We therefore had to impute whether someone was currently married or not from living arrangement, 'relation to head,' age, and sex information with a simple computer program (available on request from the authors), where legality did not matter as much as whether people were living in a union, whether religious, civil or informal. Several allocations were simple: (1) People who lived in solitary households were coded as unmarried; (2) People who were heads of households that did not have a 'spouse of head' in the household were also coded as unmarried; (3) People who were spouse of the head and were clearly married; (4) the heads of those households (with a spouse) were also clearly married.

The tricky part came from the fact that many elderly people are coded as 'other relative' (including parent or parent-in-law) of the head. We designed a program that would allocate an elderly 'other relative' as married if there was another 'other relative' in the household who was of the opposite sex and who was within 5 years (older or younger) of that individual. Our confidence in the procedure is quite high because we were able to test the procedure with the 1995 data which did have marital information. We found the program predicted marital (or union) status very well indeed, within less than 1 percent.[6]

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[5] Though "race" and "color" have different sociological meanings (see Guimaraes 1999) and might have different meanings for respondents (the word "race" is more used by black activists and more educated people and tend to be more tied to descent, and the word "color" has a more popular meaning and is more used in Brazil, being more closely tied to physical appearance), the questionnaire forces respondents to equate both, and so these meanings cannot be explored.

[6] Comparing Actual and Imputed Marital Status in 1995

	Actual Living With Spouse			
Imputed Living With Spouse	Ignored	Yes	No	Total
Yes	3	25	11,262	11,290

According to our imputation, over 70 percent of the sample was unmarried. This was particularly true of Black elderly among whom over three-quarters of the sample were unmarried. In contrast, only a little over 2/3s of Whites were unmarried. This makes a difference regarding health because overall, the mean Functional Ability score was only 5.13 among unmarried people but 5.44 among married people.

Geographic Factors

The two main geographic factors used in this study are **Region** of the country and urban/rural residence. The country was divided into five major regions: North, Northeast, Southeast, South and Center-West. Most Whites resided in the Southeast (55%) followed by the southern region (22%). In contrast, while most Blacks also lived in the Southeast (56%), many also lived in the Northeast (31%). Finally, a majority of Browns resided in the Northeast (51%) followed by the Southeast (30%). Table 1. It is relevant therefore that the average Functional Ability of elderly people was 5.1 in the North, 4.9 in the Northeast, 5.4 in the Southeast, 5.3 in the South, and 5.1 in the Center-West, and that we control for region when looking at racial differences in Functional Ability.

The second main geographic feature is **urban/rural residence**. White elderly people tend to be much more urban than either Blacks or Browns at 84 percent compared to 80 and 71 percent respectively. Elderly women are also much more likely to reside in urban areas that elderly men: 82 percent vs. 76 percent. Overall, rural residents have slightly more Functional Ability than urban residents–a mean of 5.3 vs. 5.2–but a closer look discloses that the White mean is 5.3 in both urban and rural areas but the Black mean is 4.89 and 5.17 respectively, and the Brown mean is 5.08 and 5.24 respectively. (This difference is not a significant interaction however.) The means that males and females, while different from each other, had roughly the same Functional Ability in both urban and rural areas.

Socioeconomic Factors

Three socioeconomic factors included here are education, per adult household income, and whether the household was hooked up to a public water supply (see Martelin, 1994 for a nice discussion of measuring socioeconomic factors among older people.) We emphasize that in a cross-sectional analysis such as this one, socioeconomic variables can only help predict Functional Ability (FA), not cause it. A good case could be made for health helping to cause socioeconomic status rather than the other way around.

Education was coded into illiterate, basic (1-6 yrs.), and more (6+ yrs.). Overall, about 43 percent of the elderly population were illiterate, another 41 percent had a basic education and 15 percent had more education. This varied considerably by race and sex however. While less than a third of the Whites was illiterate, this was almost two-thirds among Blacks and Browns. And while over a fifth of the Whites had more than a basic education, this was only about 6 percent among Blacks and Browns. Similarly, females were more likely than males to be illiterate, and less likely to have more than a basic education.

Education has an important bearing on health. Among illiterates, the mean health (FA) score was only 4.66. That increased to 5.44 among people with a basic education and rose to 6.23 among people with more than a basic education. Given that education is related to other factors, such as age, that have a big relation with health too, the net relation between education and health is probably much smaller but still noticeable.

Per adult household income was coded in terms of minimum wages, where 130 *Reais* constituted one minimum wage: 1) less than 3/4 of a minimum wage (<98*R*), 2) 3/4 to 1 ½ minimum wages (98-195*R*), 3) 1 ½ to 3 minimum wages (195-390*R*), and 4) 3+_minimum wages (390+ *R*). The proper use of income is tricky because, as a measure of consumption, household size is important. Yet children may not consume as much as adults and there are economies of scale involved. In the end, we settled on considering *per adult* rather than *per capita* household income because it just did not seem better to consider the consumption of children on *par* with the consumption of adults. Though it is problematic - especially for looking at gender differences -

No	1	15,059	128	15,188
Total	4	15,084	11,390	26,478

Source: 1995 national household survey (PNAD) data.

to assume that income is distributed equally within the household, the lack of data on intra-household distribution of resources leaves us with no better alternative.

It is useful to note that overall, a little over one fifth of the sample had the lowest amount of income, but that this was about one seventh among Whites while being over a fourth among Blacks and about a third among Browns. Similarly, almost a third of the Whites were in the highest income group compared to less than an eighth among Blacks and Browns.

The zero-order relation between income and health (FA) was not as straightforward as hoped, primarily because the lowest income category includes a mixture of well-being. People who lived in households that had less than 1 minimum wage per adult included people whose expenses were being provided for by people outside the household, as well as those whose independent income was truly low. Thus health contrasts between the last three income groups is clearer and as expected: mean FA goes from 4.82 in households with per adult incomes between 3/4 and 1 ½ minimum wages to 5.90 among those in households whose per adult incomes were 3 or more minimum wages.

Beside income, another household variable that can help indicate socioeconomic status is whether the household is **hooked up to a water system**. The variable is nicely correlated both with education (r=0.31) and per adult household income (r=0.34), and has independent predictive power regarding Functional Ability as well. Actually, its zero-order correlation with Functional Ability is quite low, 0.037, but it has good predictive power once response and demographic factors are taken into account. It also appears to be sensitive to controls for urban/rural residence, region, education, and whether the respondent consulted a physician within the last 12 months, controlling the first and last variables enhancing its predictive power, while controlling for the second and third variables tended to explain its predictive power.

Health Services

One of the riches of the 1998 PNAD data set is its numerous questions about health coverage, service use and service accessibility. We chose to concentrate on two factors that could have direct policy relevance and helped predict Functional Ability: 1) **whether the respondent had consulted a physician within the previous 12 months**, and 2) **whether the elderly respondent had some private health coverage**. Theoretically, Brazil has universal health coverage but actual service is poor. Private service is much preferred but having health insurance is not as necessary in Brazil as in the United States. Still, it helps (see Lobato, 2000; Bahia et al., 2003; Pinheiro, 2002).

As might be expected, people who consulted a physician in the last 12 months had lower average Functional Ability than people who did not, 4.9 vs. 6.1. Also as might be expected, women were more likely to have consulted a physician in the last 12 months compared to men, 78 vs. 65 percent. The racial distribution was even more interesting however because overall Whites had better health but were also more likely to have consulted a physician within the last 12 months. See Table 1. This is consistent with our idea that, more than anything else, the variable reflects service accessibility, and foreshadows our perplexing multivariate results discussed later.

Whether someone had a private health plan was another directly policy-relevant variable. Because if the national health program were anywhere near good, a quarter of the elderly population would not have the extra insurance. But it did. The issues are complex however, and we use a rather simplistic variable (Bahia et al., 2002). Actually, a quarter of the overall population had a private health plan, but this was over a third among Whites but less than a seventh among Blacks (14%) or Browns (13%; Table 1). Functional Ability was nicely related to having a health plan on the zero-order level: those with a plan had a mean health score of 5.70 compared to 5.06 among those without one. But having a health plan was also nicely related to such household, geographic and socioeconomic characteristics as education (r=0.43), per adult household income (r=0.47), having a water hookup (r=0.25), and urban residence (r=0.23). So is having extra health coverage a socioeconomic quality rather than a health service one? In part, but it is more than that as we shall see.

RESULTS

Estimating the minimum regression of Functional Ability (FA) on whether the respondent him/herself

answered the function questions, race, and sex explained very little (4%) of the individual variation in FA (Model 1 of Table 2). This suggests that most of the variation remained *within* racial and gender groups rather than between them although the White-Black, White-Brown and male-female contrasts were significant. Although the figures are not shown, we found that there was not an extra effect of race and gender on health beyond what each variable predicted separately.

In a second step of adding controls for the demographic variables of age, marital status and independent living we tripled the explanatory power of the model from an R^2 of .04 to .12 (Model 2 of Table 2) Age and marital status were important but Independent Living was not (even when interacted with marital status). This last finding was surprising given that we thought that living with others would be related to poorer health. The main point however is that the coefficients for the various contrasts between racial groups stayed about the same but that the gender contrast was reduced somewhat (from a coefficient of –0.99 to -0.82). Table 2, Model 2.

Further controlling for geographic factors in Model 3 only changes the explained variance slightly (unseen due to rounding). Nor does it affect the differences by gender or between Whites and Blacks. But controlling for region and urban/rural residence (primarily region) does affect the White-Brown and Black-Brown contrasts, in the first case diminishing it while in the second case enhancing it. In fact, controlling for geographic factors is necessary for making the Black-Brown contrast significant, the Functional Ability of Blacks being less than that of Browns. Table 2. This is due to the fact that a large proportion of Browns are in the Northeast while most Blacks are in the Southeast. (However, within regions, Blacks still seem to be more disadvantaged than Browns.) Thus, the argument (e.g. Cunha, 1997; Wood and Lovell, 1992) that it makes sense to put Blacks and Browns together in the same nonWhite category because they share the same disadvantage in comparison to Whites is, at least in our sample, a compositional result that is a consequence of looking at aggregate data without taking region into account.[7]

Adding controls for household and socioeconomic factors--whether the household is hooked up to the water system, education and per adult household income–in step 4 of Table 2-enhances the model's explanatory power (from an R^2 of 0.13 to 0.16), has a major impact on contrasts between racial groups, and has a modest impact on the gender contrast. The White-Black difference is reduced to insignificance while the White-Brown difference changes direction. That is, once education and per adult household income are controlled, Browns actually have greater average Functional Ability than Whites. The Black-Brown differences stays significant when only one factor is controlled, but is reduced to insignificance when education, household income, and water hookup are controlled simultaneously.

Actually, the big factor is education. It is education more than per adult household income that reduces the White-Black contrast to insignificance and that changes the White-Brown contrast from negative to positive (Browns having greater functional ability). (Controlling for the water hook-up only reduces the White-Other contrasts a little and does not reduce the gender contrast at all. It is a significant predictor at the 1 percent level however, so we leave it in the model.)[8] If we look again at the distribution of education within racial groups shown in Table 1 we might see why. While less than a third of elderly Whites were illiterate, the proportion was almost two-thirds among elderly Blacks and Browns. While being illiterate might not be all that uncommon among elderly Blacks and Browns, it is not common among elderly Whites. Elderly Whites who are illiterate may be a special group and it is in situations like these that we must take care in inferring causality because health can as much affect education as the other way around.[9] This means not only that more disadvantaged groups in education and income can seem to be more advantaged in health whey they

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[7] If one cross-tabulates race by education for the entire country, the education of Blacks and Browns is practically identical, but significant differences arise within regions.

[8] We were surprised to find that other household amenities that could be related to health such as garbage disposal or sewage system, did not seem related to the health of elderly people.

[9] Suppose there is discrimination in the labor market or the educational system that affects Browns but not Whites, and suppose health also affects education and income. Then healthier Whites would be able to get further ahead than less healthy Whites, but healthy Blacks and Browns would still not be able to take advantage of opportunities. Thus, healthy Browns and Blacks would get stuck at lower levels of income and education together with unhealthy people in all color categories, while healthy Whites would get ahead. This would mean that at the same level of income or education the average health for Blacks and Browns would be the same as for Whites, because healthy Whites would select themselves out of that educational and income level.

are equally advantaged, but also that finding an insignificant effect of race on health once education and income are controlled might conceal a disadvantage that actually exists but cannot be captured by the analysis.

Additional controls for health service factors of consulting a physician in the last 12 months and/or having a health plan (Model 5 of Table 2) do not have much effect on racial differences but do modestly reduce the gender difference although it still remains rather large. Adding the controls also increases the explained variance R^2 from .16 to .20. Actually, it is having consulted a physician that appears most important whereas socioeconomic controls appear to have already reduced the racial contrasts. Having consulted a physician reduces the gender difference somewhat because women are more likely than men to have consulted a physician (Table 1), and consulting a physician is more likely among people with poorer functional ability. This result is net of the fact that Whites were most likely to have consulted a physician.

Having a health plan has only a minor independent effect because much of its relationship with health can be explained away by education and per adult household income. (You may recall that having a health plan was nicely related to both education and per adult household income.) Its predictive effect thus overlaps the effect of the other variables, making its effect all the more difficult to interpret. If it is entered into the equation first, it has a powerful effect. If it is entered into an equation that already controls for household and socioeconomic characteristics, its effect is negligible although still statistically significant. Also, it's removal from the final model - not shown here - does not affect the size of the coefficients for racial and gender differences, though it does make the White-Brown difference insignificant at the 5 percent level. So what is the policy-relevant inference? That it has an effect, but not as much as that of education or income.

DISCUSSION AND CONCLUSION

This study's findings are consistent with the notion that there are major social inequalities in health in Brazil but that the pathways for that inequality are different for racial and gender groups. For racial groups, the inequalities can be largely traced back to such basic social structural characteristics as education and household income. For gender, they cannot be, at least not using the measures available from the Brazilian survey. It seems noteworthy however, that most of the variation in our health measure is *within* racial and gender catetgories, not *between* them. In performing our study, we also tried to get around the fact that the PNAD survey did not gather information on marital status, and became all the more aware of the undeveloped nature of measuring health in a comparable manner.

While on the simple level White elders clearly had better health than Brown elders who had somewhat better health than Black elders, differences that did not seem all that affected by demographic controls and only somewhat by geographic controls (mainly region), this changed radically once socioeconomic controls were put in place. After controlling for education in particular, Browns actually had better health than Whites, and Blacks had no worse, *ceteris paribus*. It was much more common for Blacks and Browns of varying faculties to have no education than it was for Whites, and Whites who had no education seemed particularly disadvantaged vis a vis other Whites. It seems amusing that this disadvantage put illiterate Whites on par with Blacks and even a bit worse off than Browns, though this actually could be an underestimate of the true situation given the way socioeconomic status may influence the appraisal of race in Brazil. Nor can we know how influential a selection factor might be. There is reason to believe, however, that being classified as Black as opposed to Brown does make a difference in Brazilian society, that a simple White-nonWhite dichotomy is insufficient.

While a gender difference persisted even after controls, two factors that were important in helping to understand the difference (females having worse health than males despite having lower age-specific mortality) were age and whether the person had consulted a physician in the last 12 months. It makes sense that controlling for age has such an effect since women generally live around 7 years more than men. Also, the fact that going to a physician predicts health can be seen as both a structural and a lifestyle factor, which is consistent with research that is finding the gender difference not so much biological as social. Here again however, the causality issue rears its ugly head since one could as easily argue that it is the gender issue that is causing a consultation disparity as much as it is a consultation issue that is causing a gender disparity.

In performing what could be considered a rather prosaic analysis except for its setting in a developing country, we had to grapple with two methodological issues that many researchers might take for granted. One was that the 1998 PNAD, a highly sophisticated national survey, did not gather information on what could be considered a fundamental demographic characteristic–marital status. Instead, we were forced to impute the characteristic from information on age, sex, household size, and relation to household head. There has not been research on nuptiality in Brazil comparable to the work of Hajnal on Western Europe (e.g. 1965) so we had to try to match couples using an algorithm in which a spouse could be up to 5 years older or younger than ego. Pleasantly, this imputation procedure worked remarkably well with 1995 PNAD data that did gather marital status information. We feel confident about our imputation with 1998 data.

A second methodological issue about which we feel much less sanguine is our operationalization of the concept of health. First, we decided to focus on physical health, neglecting issues of mental, social, or spiritual health. Second, we wanted to use presumably objective measures that were not gender-or economically related. Survey questions cannot avoid gathering responses that might not be accurate, especially if men exaggerate what they can do and/or minimize what they cannot do while women may do the opposite, but we did try to focus on questions that were not skewed toward gender roles and did not need the diagnosis of a doctor who might not be affordable. We used answers to questions on functional ability such as being able to carry heavy objects, being able to walk 100 meters, being able to bend over or being able to climb stairs. There are obviously good precedents for asking such questions (e.g. Stewart and Kamberg, 1992), but there is not yet an agreed standard health measure that can be used in comparative work that includes Latin America, Asia and/or Africa. Third, since we summarized various questions into a 9-point scale, we used OLS as the preferred multivariate method thereby assuming an interval-level scale of what was actually ordinal-level. While the approach seemed reasonable given the circumstances, it would certainly comfort us to see an exploration of the sensitivity of using the method.

The 1998 survey permits us a snapshot of the *national* situation but a cross-sectional analysis such as this one cannot address many issues of causality, even among the people who survived into old age. We can only predict functional ability, not explain it. Fortunately, there are efforts to scientifically examine causality using localized longitudinal studies, but those studies only began recently and cannot address issues in a different part of the country. There is, for instance, a longitudinal study of people 60 and over in *Minas Gerais* called the Bambuí study that has gathered rather detailed clinical information (including biochemical tests, DNA samples, etc.), medical histories, socio-demographic information, and life style information (e.g. smoking, drinking, and eating habits), reproductive history, physical functioning, life events, social support and mental health. Individuals are being followed up annually but it still relatively new (Costa et al., 2000). Similarly, there is a longitudinal study of the elderly people in Saõ Paulo called EPIDOSO (`Epidemiologia do Idoso') that was begun in 1991 (Ramos, 2003) and a second wave is beginning to be examined. Our best chance at obtaining time depth on a national level might be with a repeat of the special health module added to the 1998 PNAD. That would give us two comparable cross-sections with different individuals, making links impossible that could be possible with a longitudinal study. But it could answer such questions as whether the contrasts we estimated to exist in 1998 still existed X years later, and if so were getting bigger, smaller, or staying the same size. Hopefully, we at least helped identify an issue, and lay groundwork that can be used for further investigation.

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Table 1 - Percentage Distribution and Mean Functional Ability for Various Study Characteristics, for Entire Sample and By Race and Gender

		Race/Color			Sex/Gender			Funct. Ability
		White	Black	Brown	Male	Female	Total	(average)
Funcational Ability Scale:	**0**	2.02	1.92	1.63	1.49	2.17	1.88	-
	1	8.81	10.30	9.92	7.22	10.88	9.31	-
	2	10.02	12.22	9.31	6.55	12.49	9.93	-
	3	11.07	11.72	12.44	8.72	13.76	11.59	-
	4	5.76	6.89	7.27	5.14	7.28	6.36	-
	5	7.48	7.63	8.21	7.66	7.81	7.74	-
	6	7.65	9.43	8.86	8.07	8.30	8.20	-
	7	15.08	12.03	12.97	16.38	12.43	14.13	-
	8	32.11	27.85	29.40	38.78	24.87	30.85	-
Sex/Gender :	**Male**	42.59	41.11	45.65	-	-	43.46	5.76
	Female	57.41	58.89	54.35	-	-	56.54	4.81
Race/color :	**White**	-	-	-	59.58	61.75	60.80	5.31
	Black	-	-	-	6.77	7.46	7.16	4.95
	Brown				33.65	30.80	32.04	5.12
Answered FA q's self:	**No**	35.28	34.12	33.29	40.75	29.80	34.56	5.08
	Yes	64.72	65.88	66.71	59.25	70.20	65.44	5.30
Age categories:	**60-64**	31.79	33.95	33.72	36.90	29.23	32.56	6.02
	65-69	24.87	25.83	24.98	25.89	24.27	24.97	5.56
	70-74	19.04	17.26	18.13	16.87	19.97	18.62	4.98
	75-79	12.02	11.35	11.22	10.56	12.60	11.71	4.51
	80+	12.28	11.61	11.96	9.78	13.93	12.13	3.46
Lives in a union (imputed)	**Unmarried**	68.62	76.50	71.64	67.63	72.09	70.15	5.13
	In union	31.38	23.50	28.36	32.37	27.91	29.85	5.44
Lives independently:	**No**	66.18	73.33	76.15	68.61	70.86	69.88	5.22
	Yes	33.82	26.67	23.85	31.39	29.14	30.12	5.22
Region:	**North**	1.71	2.52	7.14	3.79	3.29	3.51	5.14
	Northeast	16.00	30.81	50.92	28.28	28.22	28.25	4.95
	Southeast	55.46	55.51	30.24	46.33	48.20	47.39	5.36
	South	22.15	6.86	4.88	15.61	15.45	15.52	5.35
	Center-West	4.68	4.29	6.82	5.99	4.84	5.34	5.13
Urban-rural status:	**Rural**	16.00	20.49	29.35	23.94	18.03	20.60	5.27
	Urban	84.00	79.51	70.65	76.06	81.97	79.40	5.21
Gets water from system:	**No**	8.00	22.24	31.77	19.08	14.76	16.64	5.01
	Yes	92.00	77.76	68.23	80.92	85.24	83.36	5.27
Consulted doctor:	**Yes**	75.09	69.92	67.14	64.88	77.78	72.17	4.90
	No	24.91	30.08	32.86	35.12	22.22	27.83	6.08
Has health plan:	**No**	66.04	85.91	87.10	76.55	72.40	74.21	5.06
	Yes	33.96	14.09	12.90	23.45	27.60	25.79	5.70
Education:	**Illiterate/none**	32.35	61.18	60.31	39.20	46.58	43.37	4.66
	1-6 years	46.95	32.42	33.01	43.59	39.79	41.44	5.44
	> 6 years	20.70	6.40	6.68	17.21	13.63	15.19	6.23
Household income per adult:	**less than R$98**	14.31	28.61	33.15	24.27	19.15	21.38	5.07
	R$98-195	28.89	39.48	39.28	30.67	34.76	32.98	4.82
	R$195-390	24.97	19.67	15.94	21.25	22.03	21.69	5.36
	R$390+	31.84	12.23	11.63	23.80	24.06	23.95	5.90
Total		100.00	100.00	100.00	100.00	100.00	100.00	5.22

Note: All numbers are percentages, except where "average" is indicated. Source: PNAD 1998 (IBGE)

Table 2 - OLS Regression of the Functional Ability Scale on Color, Gender and Control Variables

		(1)		(2)		(3)		(4)		(5)	
		coeff.	t-value	coeff.	t-value	coeff.	t-value	coeff.	t-value	coeff.	t-value
Answered FA q's self:		**0.34****		**0.21****	(5.33)	**0.22****	(5.46)	**0.26****	(6.61)	**0.27****	(6.96)
Race/color (1):	**Black-White**	**-0.35****	(4.49)	**-0.38****	(5.14)	**-0.35****	(4.71)	**-0.04**	(0.49)	**-0.05**	(0.66)
	Brown-White	**-0.22****	(5.57)	**-0.24****	(6.32)	**-0.15****	(3.45)	**0.10***	(2.34)	**0.09***	(2.16)
	Black-Brown	**-0.12**	(1.55)	**-0.14**	(1.79)	**-0.20****	(2.68)	**-0.14**	(1.83)	**-0.14**	(1.91)
Female		**-0.99****	(25.79)	**-0.82****	(22.10)	**-0.82****	(22.01)	**-0.77****	(21.01)	**-0.64****	(17.76)
Age categories (2):	**65-69**			**-0.45****	(9.56)	**-0.45****	(9.66)	**-0.40****	(8.55)	**-0.37****	(8.28)
	70-74			**-0.98****	(18.42)	**-0.97****	(18.24)	**-0.88****	(16.61)	**-0.84****	(16.36)
	75-79			**-1.44****	(22.92)	**-1.42****	(22.76)	**-1.29****	(20.83)	**-1.25****	(20.55)
	80+			**-2.41****	(38.11)	**-2.39****	(37.82)	**-2.20****	(34.62)	**-2.16****	(34.59)
Lives in a union (imputed)				**0.13****	(3.31)	**0.13****	(3.33)	**0.12****	(2.93)	**0.13****	(3.28)
Lives independently				**-0.03**	(0.78)	**-0.05**	(1.20)	**-0.09***	(2.26)	**-0.07**	(1.80)
Region (3):	**North**					**-0.17***	(2.09)	**-0.01**	(0.17)	**-0.07**	(0.83)
	Northeast					**-0.31****	(6.85)	**-0.12****	(2.60)	**-0.18****	(3.94)
	South					**-0.08**	(1.44)	**0.00**	(0.01)	**-0.04**	(0.70)
	Center-West					**-0.32****	(4.81)	**-0.20****	(3.13)	**-0.22****	(3.46)
Urban						**-0.10***	(2.24)	**-0.37****	(7.30)	**-0.34****	(6.76)
Gets water from the system								**-0.01**	(0.24)	**0.07**	(1.17)
Education (4):	**1-6 years**							**0.42****	(9.62)	**0.41****	(9.63)
	> 6 years							**0.91****	(14.53)	**0.85****	(13.56)
Household income per adult:	**R$98-195**							**0.04**	(0.86)	**0.06**	(1.14)
	R$195-390							**0.33****	(5.51)	**0.31****	(5.28)
	R$390+							**0.70****	(10.91)	**0.65****	(10.02)
Consulted a doctor										**-1.14****	(29.94)
Has a health plan										**0.26****	(5.25)
Constant		**5.66****	(135.87)	**6.38****	(135.69)	**6.54****	(100.57)	**5.92****	(73.70)	**6.52****	(81.76)
Observations		**21802**		**21802**		**21802**		**21721**		**21721**	
R-squared		**0.04**		**0.13**		**0.13**		**0.16**		**0.20**	

* significant at 5%; ** significant at 1%; (1) the first two variables are dummies for black and brown with white as a reference category, and the third one is black with brown as a reference category; (2) reference category: 60-64; (3) reference category: Southeast; (4)