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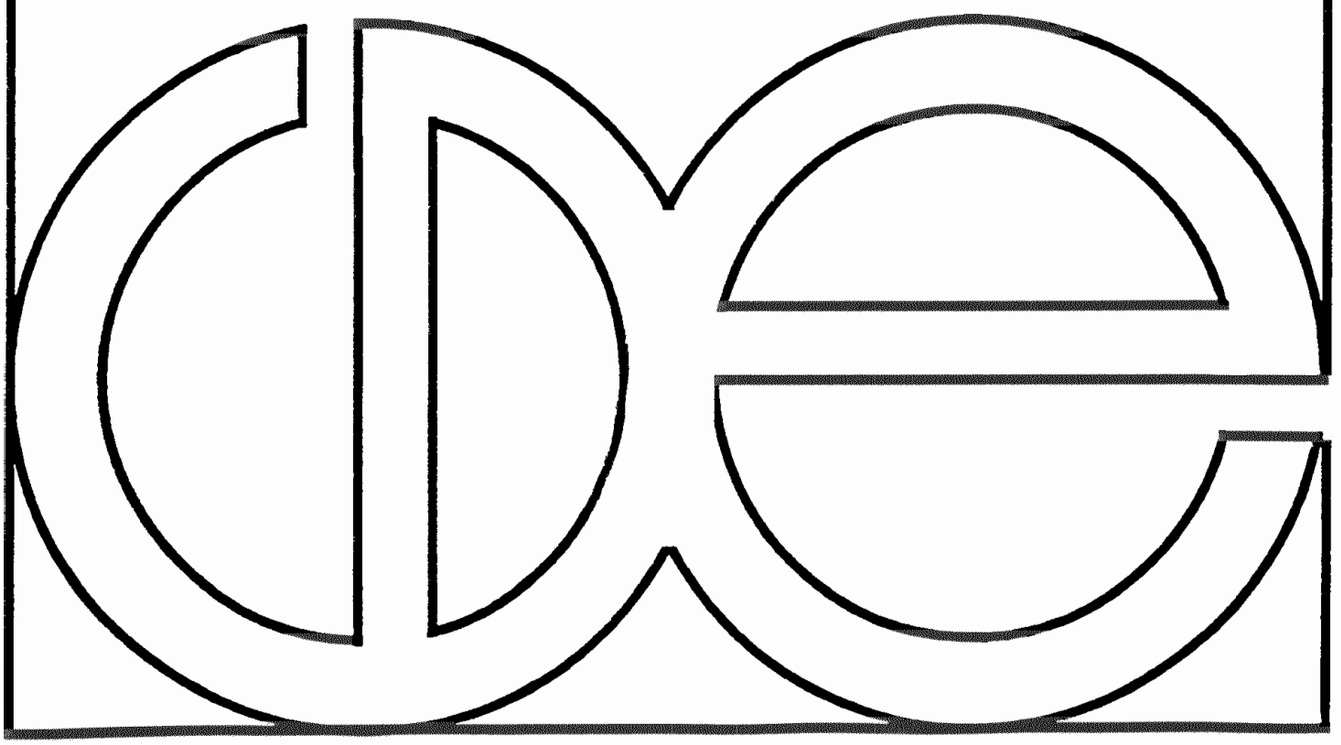
CDE Working Paper 93-06



USING HOUSING ITEMS TO INDICATE SOCIOECONOMIC STATUS: LATIN AMERICA

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This paper is written as part of the *Changing Household in Latin America* project funded by NICHD grant HD28284 and NSF grant SES-9214778. The authors are grateful to Julia Gray for valuable programming assistance. Facilities of the Center for Demography and Ecology, which receives core support for Population Research from the National Institute for Child Health and Human Development (P30 HD05876), are also gratefully acknowledged.

ABSTRACT

This note explores the possibility of using physical housing quality information from censuses to help indicate socioeconomic status, particularly that of children, elderly people, and women in developing areas such as Latin America. We develop a comparative scale from six housing items (wall material, floor material, roof material, availability of electricity, type of sewerage, and water facilities) since these items are recommended by the U.N., tend to be present in most housing censuses, tend to be highly related to each other, and tend to have a similar valuation. Items such as density and tenancy, while very important, cannot be part of the one-dimensional scale. A more basic three-item scale is also discussed because this scale might be even more widely available while providing valuable, aggregated information. The six-item and three-item scales correlate highly with each other. There is a wide range among Latin American countries in people's distribution along the scales but the scales themselves seem applicable everywhere. Not only have they been proving useful in our own research, but both scales correlate fairly well with a country's infant mortality rate on the aggregate level and with an individual's educational attainment among men and women 15-59 years of age.

INTRODUCTION

One of the most fundamental tasks of empirical sociology has been to develop good indicators of an individual's place in a social hierarchy whether the underlying theoretical perspective is Marxian, Weberian, or something else. Does one use speech? Dress? Income? Education? Occupation? Living room characteristics? Household amenities? Nutrition? Some combination of the above? If so, how? (See Matras 1984.) Whereas the theoretical importance of such factors as income may be fairly clear to some, sociologists have generally been eclectic in their outlook. After some rather detailed experimentation with a variety of possible indicators, many have come to settle on a detailed occupational scheme (e.g., Nam and Powers 1983; see also Goldthorpe and Hope 1974). Begun in places like Great Britain and the United States (Reiss 1961a), this approach has expanded to include many countries and to attempt a comparison (e.g., Treiman 1977), although Portes found problems with trying to use occupational codes with a Marxist perspective in Latin America (1985). Still, as occupation may be a good indicator of social prestige but not necessarily the best indicator of economic standing, occupation sometimes becomes a component in an even more complicated "index of socioeconomic status" (see e.g., Duncan 1961; Ganzeboom et al. 1992).

Occupation may be a good indicator of social standing for industrialized societies, but for whom? In the U.S., much research focusses exclusively on white males. So what about other racial groups, women, children, or elderly people? The general wisdom is that these people are positioned as much by such ascriptive qualities as minority status, sex, or age as by anything else, although the whole issue of women's labor force activity is a matter of much debate and research. But Reiss, Jr. could speculate for instance that the minority composition of an occupation could account for roughly one-third of the variance in prestige ranks of

occupations as of 1950 (1961b:88). Research into the "cost" of being non-white or non-male continues to this day. These are complicated issues, as Nam and Powers point out, and one has to wonder if a scale based primarily on the evaluation of the current white male work force is really accurate for other groups (e.g., Nam and Powers 1983: Chapter 6).

One has to wonder about the tendency, if using occupation to indicate the socioeconomic status of women, children or elderly people, to talk in terms of the occupation (or former occupation) of husband, former husband, or father (mothers' occupations might not be properly ranked). If the social evaluation of activity changes, does former occupation warrant an evaluation based on the current situation? Furthermore, is an anachronistic view of the family in which everyone's status can be based on the labor force participation of working-age males valid? Using information on white males may have reflected the reality of society dominated by one racial group and based on traditional family roles in which both women and elderly people were financially dependent on the labor force participation of the working-age males, but it may not be such a good indicator now in certain settings. In early research, female-dominated occupations were often omitted altogether because they proved troublesome. Occupational segregation is of course another big issue. And how does one reasonably apply the old occupational scheme for all the children now living with their mothers in single-parent households? As a U.N. report states (1984b:52):

> Since classifications related to economic activity or inactivity are usually the main basis for socio-economic group classification, their inadequacies with respect to women, some of which have already been discussed, likewise affect the measurement of socio-economic differentiation.

The report focussed on women, but similar observations could be made for other non-working-age male groups such as children or the elderly as well.

The indicator that seems most prevalent in studies of women has been education (e.g., United Nations 1984a). This can be quite adequate for women if they tend to obtain about as much education as men, as they often do in many Latin American societies. But one problem comes instantly to mind: children are not yet old enough to be in school, let alone to have finished school; and the status of elderly people may be more a function of adult children's education than their own. One could argue for the use of a mother's educational attainment when it comes to children, but then one has to be able to link children with their mothers. This is sometimes done but at other times the requirement is prohibitive. Could one also argue for the use of an adult child's educational attainment when it comes to old people? Again there would be myriad problems with linking, and one would have to consider this approach far from ideal, probably worse than for children, especially if elderly people have more than one adult child.

Other indicators of well-being that are less often used but can be enormously telling for subpopulations poorly measured by other yardsticks include those focussing on health, housing, or nutrition (see e.g., United Nations 1989). But then one often faces the situation that children's well being is measured one way (e.g., in terms of stunting) while that of older people is measured another way (e.g., in terms of health or home ownership), that of women still another way (e.g., educational attainment), and finally that of working-age males yet another way (e.g., occupation). This prompted us to ask if there could not be one measure that would apply to all age and sex groups and could furthermore use the same criteria everywhere.

This note helps describe our development and use of a housing quality index for a number of Latin American countries that could prove useful elsewhere. This development is preliminary but what we have is so exciting that we think that it should be shared with others even in its present state. It is based on the idea that the type of housing someone lives in is a

good indicator of material well-being that may be applicable to people of all ages and both sexes throughout the developing world. "The type and quality of shelter in which people are housed - the space, degree of crowding, facilities, surroundings, available transport - affect their activities of personal and family care and influence their economic activity, health, social intercourse and general outlook" (United Nations 1989:47). Young and old, women and men live in the same housing, and the development of a housing quality scale could be a useful method for differentiating within various social groups. This is not to argue that the young and old, women and men, while sharing the same housing also share equally in other resources, but in most cases information on a housing quality scale can be used for comparing counterparts. As censuses increasingly include a housing (or dwelling) section along with a population section, it makes sense to try to use such housing information as type of floor or water source to gain some notion of socioeconomic status. The potential use for such a measure in development studies is clear even if the scale only deals with physical attributes and does not include social or economic ones. But before describing our efforts further we briefly scan the situation in the United States.

The Situation in the United States

Attempts at using housing information to help indicate socioeconomic status began in earnest decades ago in the United States. For instance, the U.S. Census introduced a "state of repair" measure in 1940 (Koebel 1986). And as Baer (1976) observed in the 1970s, "Applying the minimum housing standards of the 1940s to today's housing stock reveals that the nation's housing problem has largely been solved." But the problem has been that the standards of the 1940s are not the standards of the 1990s, and by today's standards there are still millions of people in substandard housing. And perhaps there will always be if what is "standard" keeps changing (Baer 1976). Standards may change but observations of the actual situation remain the same.

After experimenting with different ways to assess an ever-changing situation, the U.S. Census Bureau and others decided to give up trying to establish a housing quality scale. After 1960, censuses have instead focussed on items like plumbing and kitchen facilities, whether they are for a household's exclusive use or are shared. Even this has proved deficient, and some people in the U.S. talk of a "post-shelter" society even while others argue that such talk is not based on firm ground because there are important differences in quality (e.g., whether dilapidated, deteriorating or sound) that need to be considered (e.g., Koebel 1986). Goedert and Goodman (1977) concluded that "census housing characteristics do not generally serve as good proxies for a wider range of housing quality indicators." The need to gather meaningful housing information persists, but people seem unsure as to what it should be.

A common feature of people's attempts at developing a housing quality scale in the U.S. has been the concern to incorporate a number of features in that scale that go beyond physical characteristics to include social and economic ones as well. For instance, two housing units with similar physical attributes could be valued quite differently (as indicated by rent or selling price), depending on location. Goodman (1978) examined the idea that rent burden, crowding, and unit and neighborhood features could be considered dimensions of one index. He found that they could not be.

Studies based on the situation in the U.S. often have the somewhat disturbing quality that what is learned cannot be used in other contexts. In some ways, U.S. studies show the way for studies using other data sets, but in other ways they show a complete lack of interest in the applicability of their work to other contexts. In our case, we found little from the U.S. studies that could be applied to our study of Latin American censuses except for the notion that we should limit ourselves to features that help indicate the same dimension. For the most part however, we had to start from "scratch," as it were, with the assistance of some U.N. publications.

SCALE DEVELOPMENT

Data

A housing module along with a population module has become an increasingly common item in national censuses as governments become ever more convinced of the usefulness of housing information. Items like density (people per room not a kitchen or bathroom), type of dwelling (i.e., house, apartment, room), source of water (river, well, public pipe), sewage hookup, construction materials, accessibility to electricity, tenancy and privacy of bathrooms and kitchens have become fairly standard (United Nations 1988). So far however, although some of the items would seem to help indicate an underlying factor called "housing quality," the items have not been combined into a standard scale, perhaps because the situation in different locations is thought to vary too much. But we have found that throughout Latin America, and perhaps elsewhere, people have basically similar valuations of housing materials, major criteria being durability and healthiness. In addition, everywhere many useful objects require the use of electricity.

We had the opportunity to examine 16 census microfiles for the 1970 and 1980 rounds of Latin American census: Argentina (1981); Bolivia (1976); Brazil (1970, 1980); Chile (1970, 1982); Colombia (1973, 1985); Costa Rica (1973, 1984); Dominican Republic (1981); Ecuador (1974, 1982); Panama (1980); and Paraguay (1972, 1982).[1] All censuses had the information needed to calculate density (persons per room) and tenancy. These variables do not necessarily help indicate "housing quality" in the sense we mean, however. Of possible housing items useful for developing a one-dimensional scale we call "housing quality," we found six items

[1] The Argentina 1970, Dominican Republic 1970, and Panama 1970 census microfiles that we have only refer to the population, not housing. We are now processing the Mexico 1970 and Guatemala 1981 census microfiles; they cannot be included in this analysis.

common to all but two of the data files: wall material, roof material, floor material, availability of electricity, water source and type of sewage system (see Table 1). Most country censuses provided information on additional dwelling characteristics such as bath and toilet facilities, whether there was a separate kitchen, and ownership of various household appliances. Unfortunately, they did not have these all in common and the information could not be included in a comparative scale (see Table 1). Three of the six items were common to even the two that did not have all six, prompting us to develop two scales, one with the full six items and one with the fewer three items of electricity, water and sewage. We reasoned that not only were these three applicable in circumstances that we confronted but they might also be found in other data sets that did not have all six items. Even with only three items, a small scale that aggregated information about several features was far superior to using only one variable with perhaps three or four categories. And, as we discuss further below, although we prefer the larger scale, use of the smaller scale might prove more reasonable in some circumstances.

Items in Scale

As noted previously, we developed one scale with all six items and one with only three items. The six-item scale used information on 1) material of outer walls; 2) material of floors; 3) material of roof; 4) availability of electrical service;[2] 5) type of sewage service; and 6) type of water service[3]. The three-item scale used information on the last three items (Brazil 1970 and Colombia 1985 had to use this scale). Although they contained basically the same

[2] Availability of electricity appeared to be somewhat ambiguous. In some cases, census questionnaires asked if electricity was used for lighting. In other questionnaires we are simply told whether there was electricity (yes, no).

[3] There appeared to be two issues, sometimes dealt with separately, sometimes dealt with together. One was whether there was a connection to some water facility through pipes, etc. The other issue was that connection's indoor/outdoor accessibility status.

information everywhere, none of the items was coded the same (even often in two censuses of the same country) but rather had to be standardized into identical variables everywhere/time. This is the area most subject to human error and/or improvement because local language was sometimes used to identify a construction material that was not used anywhere else. Nor could we be sure that the same word was being used identically in different settings even if we applied a common rule for how to treat it. Yet we attempted standardization because, despite different categories, individual census publications soon made it clear that most items seemed to be valued similarly throughout Latin America[a] (see Appendix A). For instance, categories for "wall", "roof", and "floor" were first standardized according to durability; categories for water ("pipes") and "sewerage" were standardized according to hygienic quality; and the variable for "electricity" was standardized in terms of availability. With the sole exception of the Dominican Republic, all country census publications listed dwelling materials in terms of quality and durability. Some listed materials in terms of low/high quality/durability, while others (like Panama) listed durability in terms of permanent, semi-permanent, and improvised. Still others (e.g., Chile 1970) listed quality in terms of good, acceptable, and bad. Some country publications explicitly differentiated between roof, wall, and floor in terms of material but discussed quality and durability in terms of the entire dwelling (e.g., Costa Rica 1973), while others reported on these topics individually for the dwelling's roof, walls, and floor (e.g., Costa Rica 1984; see also Table 2).

For the standardized wall material variable "wall," consider the cases of Bolivia and Chile for example (see also Tables 2 and 3). The categories for outer wall material in the original Bolivian census (1976) were 1) covered adobe, 2) uncovered adobe, 3) blocks of concrete, bricks, 4) stone, 5) wood, 6) cane, palm, sticks of wood, and 7) other material. In the original Chilean censuses (1970 and 1982), outer wall materials were 1) concrete, brick,

stone, 2) wood, 3) uncovered adobe, 4) refuse, and 5) other material. Since country-specific discussions valued the material similarly, we constructed a standardized "wall" variable that had four categories ranging from more to less durable: 3) masonry (brick, block, cemented (or covered) adobe, stone), 2) wood, uncemented block (or uncovered adobe), 1) cane, palm, mud-hay, leaves, straw, other plant source, and 0) metallic sheet (zinc, other), sticks, refuse, other discarded material (see Table 3).[4] (Masonry (brick, block, cemented adobe) was everywhere considered superior to wood, while wood was considered superior to bamboo, hay, aluminum, or refuse.)

The standardization of a variable for roofing material ("roof") was similar, even having four nearly identical categories — see Table 3. (The criterion used by all countries for construction material has been durability or permanence.) Standardizing the variable for floor material ("floor") also was straightforward. Some censuses, like that of Argentina in 1981, had a rather detailed list: 1) tile, 2) wood, 3) cement or brick, 4) dirt, 5) other. However, other censuses like Chile 1970 only differentiated between dirt flooring and everything else (e.g., brick, stone, tile, carpeting, plastic, parquet etc.). Consequently, the standardized variable could only be a dichotomy (see Table 3).

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[4] In Costa Rica what we initially interpreted as a low quality metallic sheet after some investigation appeared to be a material of some value compelling us to "deviate" from a strict application of this scheme there. Rather, we allocated this type of material a high mark (3) if the dwelling was in good condition, a high-medium mark (2) if the dwelling was in normal or average condition and a low-medium mark (1) if the dwelling was in poor condition. We did this for both wall and roof material, and alphas for the standardized measures probably reflect this. In 1973 the condition variable referred to the entire dwelling while in 1984 the condition was specific to wall, roof and floor material respectively. While people might quarrel with this approach we found it most reasonable because of the order (second from the very best) of this material and because it was so common.

For water, according to the UN, the most basic and significant information that should be obtained in censuses is whether housing units have piped water, whether from a community-wide system or private installation. Both source and access are at issue. The UN stressed the need to differentiate between indoor and outdoor access, as it deemed that this may be the most relevant information about a housing unit from a health perspective (United Nations 1980). Piped water from an aqueduct or other piped system is deemed superior to water from a well or spring because the former is usually treated for disease-causing agents. And although well or spring water may or may not be adequate for consumption, it is usually deemed safer than river, canal, rain or fountain water as the latter sources have a higher probability of becoming contaminated. Thus one might conceive of a standard four-category variable that we call "pipes" in which 3=indoor piped water, 2=outdoor piped water, 1=well or spring water, and 0=stream, river, canal, rain or fountain water, and water truck. (It is unclear from what source water in water trucks comes.)

We can illustrate the standardization of "pipes" with the cases of Ecuador and Colombia. The Ecuador censuses of 1974 and 1982 had the following categories regarding water: 1) public piped system inside of unit, 2) public piped system outside unit but within building, 3) public piped system outside building, 4) well or spring, 5) river, 6) water truck, 7) other. In contrast the Colombian censuses of 1973 and 1985 used different variables to measure access and source. One question asked whether or not the water was piped directly to the individual unit. A second question categorized water source as follows: 1) piped system from aqueduct or public pipe, 2) well or cistern, 3) river, canal, 4) water truck, and 5) rain water. See Table 3. Despite the variability in questions and the tremendous differences between

countries, the cases enabled us to construct a standard "pipes" variable as envisioned above.[5]

For sewerage the United Nations recommended that a distinction be made between piped sewerage systems, individual sewage systems (septic tank, cesspool, pit), and other systems (lakes, rivers). Consequently, all countries deemed piped sewerage systems (either in the form of an underground network of pipes connecting the housing unit to a public or private sewage elimination system or a piped system connecting the unit to a private or community septic tank) preferable to cesspools, latrines, or outhouses, particularly in terms of hygienic standards. These latter systems are usually unconnected to pipes leading to the unit. However, they are preferable to other outlets such as rivers, open canals, or streams. Cesspools, latrines, and outhouses indicate the existence of a place that is solely designated as a recipient of human waste. This, of course, is hygienically preferable to the elimination of wastes in rivers, streams or canals which poses a health threat to all those residing in a community, particularly if the same rivers, streams or canals serve also as sources of drinking water. Thus we devised a standardized "sewages" variable with the following categories: 2) piped system (public/private), iped septic tank; 1) blackwater well, cesspool, latrine, outhouse; 0) no system, other (river, canal, other natural outlet (see Table 3).

Again we illustrate the similarity of censuses from very different places in Latin America using the examples of Panama in 1980 and Paraguay in both 1972 and 1982. The Panama 1980 census gathered the following categorized information regarding sewerage: 1) connected to sewerage system, 2) connected to septic tank, 3) latrine or hole in the ground, 4) no facilities at all. Similarly, the Paraguayan 1972 and 1982 censuses had 1) connected to public system, 2) connected to other system, 3) outhouse, 4) latrine, and 5) no system.

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[5] The standard "pipes" variable refers specifically to drinking water.

Finally, the reasoning behind the ordering of the categories of the dichotomous variable "electricity" is self-evident (see Table 3). Most countries simply asked whether or not the housing unit had electricity. Some asked further about other types of lighting, but these were the minority. For instance, Colombia simply asked if the housing unit had electricity (yes/no). Costa Rica asked about type and source of lighting used: 1) electricity (publicly provided), 2) electricity (privately provided), 3) kerosene, 4) other, and 5) nothing.

In standardizing, the highest values were always assigned to the best quality and ordered such that zero was always assigned to the worst quality. This facilitated the scale construction discussed in the next section. However it is important here to note that in all cases, the number values assigned to each category are arbitrary. It is impossible to say, for example, that the unit difference between masonry and wood is equal to the unit difference between wood and cane or that between cane and refuse. In statistical language, we have developed ordinal variables, not nominal or interval ones. This quality of ordinality (in contrast to interval quality) obtains to the aggregate scales as well. Also, neither scale has a literal interpretation unless someone scores the highest or lowest since they are simple arithmetic summations of various components, as is discussed in the next section.

Scaling Method

Once items have been selected for combination into a scale (the idea being that they help tap some underlying (latent) factor) the questions become how best to combine them and whether they do in fact tap into the latent factor that in our case we call "housing quality." We started with the premise that it would be reasonable to simply add up the scores on the standardized items in a way that would be easily reproducible in other contexts. Then, since we cannot compute the correlation between each individual element and the latent factor (there is no direct method of estimating the latter's true value), we ascertained the relationships between all the

scale elements. That is, we assessed the internal reliability of the scale as constructed in the above-mentioned manner. Classical measurement theory suggests that "if the items of a scale have a strong relationship to their latent variable, they will have a strong relationship to each other" (De Vellis 1991; see also Carmines and Zeller 1979).

The most widely known and used measure of internal consistency is Cronbach's coefficient Alpha, α, that uses Spearman's correlations between scale items. Cronbach's Alpha is "the proportion of variance attributable to the true score of the latent variable."[6] Alpha partitions the variability in item scores into a portion due to the "true variation in the latent variable," and a portion due to error. More precisely, Alpha is the ratio of the variation of the latent variable to total variation (the sum of the common variation and variation due to error). As a secondary check, we employed Factor Analysis to confirm the notion that our scales did indeed tap well one and only one underlying factor.

There is no consensus on the minimum acceptable score for Alpha. Some, like Nunnally (1978, from Carmines and Zeller 1979), suggest that a value of .70 is the lowest acceptable bound, while Carmines and Zeller (1979) consider it to be .80. The most reasonable suggestion to us was that below .60 was "unacceptable"; between .60 and .65 was "undesirable"; between .65 and .70 was "minimally acceptable"; between .70 and .80 was "respectable"; and between .80 and .90 was "very good" (De Vellis 1991). Alphas are listed in Table 4 for all the data sets and both scales (6-item and 3-item).

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[6] Using the Spearman-Brown prophecy formula:

$$\alpha=kr/1+(k-1)r$$

where r is the average inter-item correlation, and k is the number of scale items. There were 15 Spearman's correlations among constituents of the six-item scale, three of the three-item scale.

Ranging from .71 to .96 for the six-item scale, we found Alpha generally to be around .79, thus putting it in a "respectable" category. Ranging from .67 to .89 for the three-item scale, we found Alpha generally to be around .80, generally putting it in the "respectable" or "very good" categories, although the scale for a couple of censuses was minimally acceptable (in the Dominican Republic and Paraguay). See Table 4. We interpreted this to mean that we had reasonable scales when simply adding up the various scores on individual standardized items. Scale items furthermore helped indicate one underlying dimension.

The Scales Country-wide

The first question one might ask is what the scales look like. The answer is that they vary considerably between countries just as other factors vary so much between countries in Latin America. Let us first look at frequency distributions, means and standard deviations of both scales in various countries shown in Table 5. On the one hand are countries such as Argentina, Chile, and Costa Rica in the early 1980s with means of about 10.4 11.0 and 10.9 on the big scale and 5 on the small one. On the other hand are countries like Ecuador with mean scores in the early 1980s of only about 6.5 on the big scale and 2.5 on the small one (Table 5).

Averages of course are only measures of central tendency; it is important to have information on spread as well. Perhaps the best way, if all the figures are not too overwhelming, is to peruse frequency distributions. If this is done it becomes clear that Argentina, Chile and Costa Rica may all have fairly high averages — averages based on significant underlying differences. For example, in Argentina in 1981 no one had a score of 0 for the six-item scale and 45 percent had the maximum score of 13. Less than 5 percent had scores of 12 or 11 individually, but almost another 18 percent had a score of 10. In Chile in 1982 there were no 0s either, but only a third of the people lived in households with a maximum score (vs. 45%). On the other hand over 10 percent of the population has scores of 10, 11, or

12 individually (actually 20 percent for 12). Costa Rica in 1984 also had a spread near the top although it was smaller, and it did have cases of 0. Perusing the standard deviations, while helpful indicators of spread, would not have given us this information as it was 3.0 in Argentina, 2.1 in Chile, and 2.6 in Costa Rica.

Consider also the frequency distribution of Ecuador on the three-item scale (although this time the standard deviation seems more helpful). There is heavy loading on the lowest three values and a rather heavy loading on the highest value. See Table 5.

Comparison of 6-Item and 3-Item Scales

The larger scale ranging from 0 to 13 uses more information than the three-item scale ranging from 0 to 6 and is preferable in this respect. However, multivariate techniques are not well developed for ordinal-level independent variables and it is common to treat them as if they were interval level. In contrast, someone may only want about seven values to distinguish people because the resulting variable could be used as categorical rather than "continuous." Its use might also widen the number of possible populations to include in a comparison even if less is being compared.

The best way to compare the alternate scales is probably by assessing their relative predictive value for some substantive issue. Here, we simply show somewhat formally that the substitution of one scale for another is reasonable in most circumstances. To do this, we estimated the Spearman's correlation of the two measures for everyone, men and women separately, and for young (0-14 yrs.), working age (15-59 yrs.), and elderly (60 and above yrs.) people. The results are shown in Table 6. In general, the correlations are .80 or above, although in Paraguay 1972 they go below .70. Among subgroups, correlations range from .65 (among children in Paraguay 1970) to .94 (in Brazil in 1980). This suggests to us that in most cases substitution could be warranted but that it is not safe to assume near identity.

The Scales Within Countries

Just as one can examine variation in the scales between countries, one can also readily find variation in the scales within countries. Scale means for a few different subgroups of the population within countries are shown in Table 7. We see little difference overall between males and females or between age groups. In contrast, there appears to be a significant difference in scale means (both substantively and statistically) between urban and non-urban (or rural) areas. For instance, the mean of the big scale is 10.8 in urban Brazil in 1980 but only 6.7 in rural Brazil in 1980 (the small scale's means are 4.5 vs. 1.4). The difference in means for Ecuador in 1982 was estimated at 9.1 vs. 5.3 for the big scale and 4.3 vs. 1.7 for the small scale. Although the absolute difference between urban and non-urban areas differed (in part perhaps due to the different definitions of "urban") the means were everywhere higher in urban areas.

Given such a large urban/rural difference, one has to wonder how much of the variation we observed between countries could simply be accounted for by the proportion of their population in urban areas. If we just look at the mean scores for residents of urban areas, the range of means for the early 1980s is smaller, but still from 8.3 in the Dominican Republic to 11.4 in Chile for the big scale, and 4.3 in Ecuador to 5.6 in Costa Rica for the small scale (compared to 7.2 vs. 11.0 and 2.5 vs. 4.6 for the entire countries).

The Scales Over Time

The scales also seemed on average to be higher in the 1980 round of censuses than in the 1970 round. For instance, Chile had an average on the big scale of 10.2 in 1970, but 11.0 in 1982. Costa Rica had an average of 9.7 on the big scale in 1973, but 10.9 in 1984. Brazil had an average on the small scale of 2.5 in 1970, but 3.3 in 1980; and Colombia had an average on the small scale of 3.9 in 1973, but 4.6 in 1985. Does this mean that a scale developed with information for one time will not be particularly discerning at a later date, as was the case in

the U.S.? That is possible of course, but we can only point out that even the countries with the highest scores were not yet about to go off the scales. And in Ecuador and Paraguay, although the mean of the small scale rose in an expected manner, that of the large scale only rose slightly (from 6.1 to 6.5 in Ecuador) or actually declined (from 8.4 to 8.0 in Paraguay). Thus it seems that the scales will continue to be discerning for some time but that at some point they may well be superseded by a scale based on a more current distribution of housing characteristics. Perhaps this is most likely to happen in Argentina when housing quality improves, but even here less than half of all individuals had the maximum score of 13 on the big scale in 1981.

It might be helpful to note that although the scale is an objective measure, its development was influenced by our own standards of what constituted a minimum quality. Since standards change with the times, it might be most reasonable to establish just what should exist as a minimum for healthy human habitation and proceed from there.

THE SCALES AS INDICATORS OF SOCIOECONOMIC STATUS

That the scales seemed reasonable was a first step, but did they help indicate the ephemeral concept "socioeconomic status?" We ask this both on the aggregate level and on the individual level. First, we find that the scales are roughly consistent with what one might expect from knowledge of such factors as a country's per capita GNP, urbanization (population proportion in urban areas) and, perhaps most telling, its infant mortality rate. These indicators are listed in Table 8 and graphed in Figure 1. The correlations (Pearson's) between the infant mortality rate and the means of the large and small scales were -.66 and -.76 respectively, suggesting reasonable indicators of socioeconomic status at the aggregate level.

What about on the individual level? Since no one variable could be used to help

indicate socioeconomic status for everyone, a situation having motivated this examination in the first place, we settled on looking at the individual-level correlations (Spearman's) between our scales and a standardized educational attainment variable for adults aged 15-59 of both sexes (whether we used 15 or 25 as the lower limit for the group did not effect the figures much).[7] This is a more difficult task than it may seem because educational attainment tends to be a country-specific piece of information that often contains many categories. Since going into any detail about this measure is outside the scope of this note, suffice it to say that we wanted to devise some check on the scales, and the education variable does not have to be "the ultimate" one to make our findings interesting.

Correlations (Spearman's again) between education and the housing quality scales are shown in Table 9. Generally, we found the correlations good for both scales. Correlations ranged from .38 to .53 for the six-item scale, averaging .46; and .37 to .59 for the three-item scale, averaging .47. While the figures differed a little for men and women, they were basically the same. Again it seems, the correlations were lowest in Paraguay ($\sim$.43 in 1972 and .38 in 1982 for the six-item scale and .39 and .37, respectively, for the three-item scale) but much better in a number of other countries (e.g., Panama, Colombia, Brazil). Thus the scales and a

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[7] The measure for educational attainment was a measure we created based on the different educational schemes in different countries and even in the same country at different times. Nobody, it seems, has developed a comparative measure of education from census data. We thus had to develop our own that admittedly is our "first shot" at the issue and should probably be refined as we learn more. All educational achievement was placed into one or another of the following categories:

1. None/illiterate/missing
2. Literate but less than primary school
3. Primary/basic school graduate
4. Some post primary school (middle school, some high school)
5. High school graduate
6. University, superior, etc.

measure of educational attainment are not interchangeable variables (nor auto-correlating) but they are both useful indicators of something we tenuously conceive of as socioeconomic status.

A couple of "unrelated" research efforts buttressed the notion that the scales were reasonable indicators of socioeconomic status on the individual level. One effort was a study by both authors of socioeconomic well-being in Colombia and its relationship to single-parent headship among mothers 15-59 years of age in 1985. We found the Spearman's correlation between our (smaller) housing scale and education among this group to be .47 and generally found the scale to be a helpful measure in different regions of the country (De Vos and Arias 1993). In a second effort Arias found the smaller scale to be quite useful in her demographic study of female-headed households in Chile and Paraguay (Arias 1994).

CONCLUSION

This paper proposes a standard comparative housing quality scale that could help indicate the relative socioeconomic status of all kinds of individuals, not just white middle-aged men. It was motivated by several considerations: 1) most national censuses now are censuses of housing **and** population and one need not rely solely on the "population" part to derive meaningful indicators of socioeconomic standing; 2) there does not presently exist **one** indicator of socioeconomic status for all individuals in society unless one applies a score of a present or former occupation of a middle-aged person, father, husband, or ex-husband; 3) what started as an in-house project to make sense of census data from a large number of countries proved exciting enough that we decided to report on it for other comparative study researchers.

The purpose of the report is not so much to present a finished product that should be copied as literally as possible but to foster more investigation, debate and ultimately development

of a "final" standardized scale. Whether it is the Demographic and Health Survey or some other intended comparative study, one hears complaints constantly that insufficient attention is paid to the development of comparative measures. There will always be criticism of comparative measures, some well founded, but unless one is content to always limit one's study and ability to generalize to only one population, one has to wrestle with this messy business. With this in mind, we offer you the idea of a comparative housing quality scale and, it is hoped, a direction in which to go with it.

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Table 1. Checklist for the Existence of Housing Items in Selected Latin American Census - 1970-1985

Census	Item													
	Type	Ten.	#Rms	Wall Mat.	Floor Mat.	Roof Mat.	Water Source	Sewage	Electric.	Size	Rent	Shower	Kitchen	Stove
Argentina 1981	X	X	X	X	X	X	X	X	X	X				
Bolivia 1976	X	X	X	X	X	X	X	X	X	X		X	X	
Brazil 1970	X	X	X				X	X	X	X	X			X
Brazil 1980	X	X	X	X	X	X	X	X	X	X	X			X
Chile 1970	X	X	X	X	X	X	X	X	X	X		X	X	
Chile 1982	X	X	X	X	X	X	X	X	X	X		X	X	
Colombia 1973	X	X	X	X	X	X	X	X	X	X			X	
Colombia 1985	X	X	X	X	X		X	X	X	X			X	
Costa Rica 1973	X	X	X	X	X	X	X	X	X	X				
Costa Rica 1984	X	X	X	X	X	X	X	X	X	X	X		X	
Dom. Rep. 1981	X	X	X	X	X	X	X	X	X	X	X		X	X
Ecuador 1974	X	X	X	X	X	X	X	X	X	X			X	
Ecuador 1982	X	X	X	X	X	X	X	X	X	X			X	
Panama 1980	X	X	X	X	X	X	X	X	X	X			X	
Paraguay 1972	X	X	X	X	X	X	X	X	X	X			X	
Paraguay 1982	X	X	X	X	X	X	X	X	X	X			X	

Table 2. Dwelling Construction Materials by Country

	Construction Materials	
Country	Poor Quality/Durability	High Quality/Durability
Argentina	dirt, metallic sheet	tile, masonry, cement, brick, wood
Bolivia	hay, straw, cane, planks, refuse, palm, trunks, cardboard, tin,dirt, bamboo, sticks	
Brazil	non-prepared wood, dirt, thatch	brick, cement, stone, prepared wood
Chile	straw-mud, bamboo, zinc, dirt, tin, carton, refuse	
Colombia	Semi/non-permanent: cane, refuse	Permanent: brick, block, pre-fabricated adobe
Costa Rica	Improvised: refuse Semi-permanent: palm, cane, zinc	Permanent: cement, stone, cemented adobe, blocks, bricks, wood
Ecuador	palm, hay, other vegetable, cane	gravel, stone, brick, prepared wood
Panama	Improvised: straw, leaves, cane, sticks, metal, zinc, aluminum Semi-Permanent:wood, fibrecement, planks	Permanent:block, brick, gravel
Paraguay	cardboard, tin, aluminum, canvas	

Table 3. Housing Quality Scale

WALL (Predominant Material of External Walls)

3=Masonry (brick, cement block, cemented adobe, stone, gravel)
2=Wood, uncemented adobe
1=Cane, palm, mud-straw, leaves, other non-durable plant material
0=Metallic sheet (zinc, other), sticks, refuse

FLOOR (Predominant Material of Floors)

1=Ceramic, marble tiles, cement, cement blocks, bricks, wood, carpeting, vinyl tile
0=Dirt, non-durable plant material

ROOF (Predominant Material of Roof)

3=Baked clay roof tiles, asphalt, cement, gravel, other durable roof tile
2=Wood, asbestos, fibre-cement
1=Straw, cane, plantain/palm leaves
0=Metallic sheet, canvas, cardboard, other refuse

ELECTRICITY (Electrical service to housing unit)

1=Yes
0=No

SEWERAGE (Type of sewerage system)

2=Piped system (public/private), piped septic tank
1=Black water well, cesspool, latrine, outhouse
0=No system, other (river, canal, other natural outlet)

PIPE (Water supply system and indoor/outdoor access)

3=Piped indoor from (public/private) aqueduct or other similar system
2=Piped to outdoor location from (public/private) aqueduct or other similar system
1=Well, Spring (with or without pump) not piped
0=Public fountain, river, canal, water truck, cistern

Table 4. Cronbach's Alpha for 6-Item and 3-Item Housing Quality Scales for Selected Latin American Censuses

Country/Time	6-Item Scale	3-Item Scale
Argentina 1981	.78	.87
Bolivia 1976	.78	.81
Brazil 1970	--	.89
Brazil 1980	.80	.85
Chile 1970	.80	.84
Chile 1982	.77	.81
Colombia 1973	.84	.84
Colombia 1985	--	.82
Costa Rica 1973	.96	.78
Costa Rica 1984	.89	.75
Dom. Rep. 1981	.71	.69
Ecuador 1974	.73	.85
Ecuador 1982	.74	.82
Panama 1980	.79	.84
Paraguay 1972	.75	.67
Paraguay 1982	.80	.70

Table 5. Frequency Distribution in Percents, Mean, and Standard Deviation of 6-Item and 3-Item Housing Scales for Total Populations of Selected Latin American Countries

6-Item Scale

FREQ	AR81	BO76	BZ70	BZ80	CH70	CH82	CO73	CO85	CR73	CR84	DR81	EC74	EC82	PA80	PY72	PY82
0	--	0.6		0.0	0.1	--	0.1		1.3	0.1	0.0	0.2	0.3	0.1	0.0	0.0
1	0.1	2.0		0.2	0.2	0.0	0.6		1.8	0.2	1.5	2.0	1.7	0.9	0.2	0.2
2	1.0	6.5		0.9	0.6	0.0	4.5		2.0	0.5	4.4	6.2	7.6	3.4	0.3	0.4
3	2.1	16.9		3.1	1.1	0.2	6.0		1.7	0.9	7.9	17.3	16.8	6.1	1.3	1.7
4	3.0	19.2		3.4	1.4	0.5	5.6		2.2	1.3	8.2	16.1	13.7	6.2	4.8	5.9
5	3.5	11.0		6.0	3.0	0.8	6.6		3.7	1.9	6.0	9.8	8.3	6.8	15.6	13.8
6	4.3	7.9		7.2	5.2	2.8	5.6		5.5	3.2	8.2	10.1	8.3	6.4	20.5	16.5
7	4.6	8.5		9.5	7.2	4.0	5.0		6.0	4.2	15.0	7.9	6.9	8.7	18.9	13.9
8	5.1	4.6		9.7	8.8	5.9	5.1		6.1	5.3	18.2	5.4	6.2	13.4	8.6	8.4
9	5.3	5.4		8.4	8.5	7.8	5.1		7.9	7.1	12.8	4.8	6.5	13.4	6.0	6.2
10	17.9	6.3		7.9	8.6	11.8	6.9		11.2	8.5	5.8	5.2	5.7	20.1	8.8	7.8
11	3.6	2.7		9.9	9.0	11.2	13.0		12.0	11.5	0.9	4.4	3.5	2.1	5.7	7.1
12	4.4	4.0		15.0	16.9	20.5	21.4		12.3	18.0	3.7	6.3	7.6	3.8	3.9	7.5
13	45.1	4.3		18.9	29.5	34.3	14.5		26.3	37.3	7.3	4.3	6.8	8.6	5.3	10.8
Mean	10.4	5.9		9.3	10.2	11.0	9.0		9.7	10.9	7.1	6.1	6.5	7.9	8.4	8.0
S.D.	3.0	3.2		3.1	2.8	2.1	3.6		3.3	2.6	3.0	3.3	3.5	3.0	2.6	2.9

3-Item Scale

FREQ	AR81	BO76	BZ70	BZ80	CH70	CH82	CO73	CO85	CR73	CR84	DR81	EC74	EC82	PA80	PY72	PY82
0	2.6	32.4	31.2	14.2	4.2	0.2	13.4	7.6	6.6	1.5	6.5	28.4	21.0	4.0	0.6	0.4
1	5.0	23.5	14.1	15.5	7.3	5.4	12.7	3.8	8.3	4.3	12.5	27.5	27.0	9.5	7.1	5.6
2	5.6	9.2	11.7	11.2	9.8	2.0	3.9	8.1	6.3	5.7	5.9	10.6	12.4	8.0	27.9	20.6
3	6.1	13.3	8.1	8.8	9.7	9.1	8.5	7.6	4.5	4.0	5.5	5.5	6.9	11.6	44.1	36.9
4	8.8	5.6	5.4	9.4	10.7	14.6	5.6	5.0	13.8	9.0	14.8	3.9	5.0	15.5	9.9	15.1
5	5.2	8.0	5.4	14.4	11.7	13.1	16.1	6.4	25.6	20.4	36.3	10.1	9.2	16.7	4.5	9.5
6	66.8	8.2	24.0	26.6	46.6	55.6	39.8	61.5	34.9	55.2	18.6	14.1	18.5	34.7	5.8	11.9
Mean	5.0	1.9	2.6	3.3	4.4	4.9	3.9	4.6	4.3	5.0	3.9	2.2	2.5	4.1	2.9	3.4
S.D.	1.7	2.0	2.4	2.2	1.9	1.5	2.3	2.0	1.9	1.5	1.9	2.2	2.2	1.9	1.2	1.4

Table 6. Spearman's Correlation of More Detailed and Simpler Housing Scales Among Age and Sex Groups in Various Latin American Censuses

	Total				Males				Females			
	All	0-14	15-59	60+	All	0-14	15-59	60+	All	0-14	15-59	60+
Argentina 1980	.82	.86	.79	.72	83	.86	.81	.76	.81	.86	.78	.70
Bolivia 1976	.85	.84	.86	.82	.85	.83	.86	.80	.86	.84	.87	.84
Brazil 1980	.93	.92	.94	.94	.93	.92	.94	.93	.94	.92	.94	.94
Chile 1970	.92	.92	.91	.91	.92	.92	.91	.92	.91	.92	.90	.90
Chile 1982	.89	.90	.88	.89	.90	.90	.89	.91	.88	.90	.87	.87
Colombia 1973	.90	.91	.89	.90	.91	.91	.90	.91	.90	.91	.88	.89
Costa Rica 1973	.85	.85	.84	.83	.85	.85	.84	.84	.85	.85	.84	.82
Costa Rica 1984	.80	.82	.79	.77	.81	.80	.80	.80	.80	.82	.78	.75
Dom. Rep. 1981	.90	.91	.90	.91	.91	.91	.90	.91	.90	.91	.89	.91
Ecuador 1974	.84	.83	.86	.85	.83	.82	.84	.83	.85	.83	.87	.86
Ecuador 1982	.88	.86	.89	.88	.87	.86	.88	.87	.88	.86	.89	.89
Panama 1980	.91	.93	.90	.88	.92	.93	.91	.89	.91	.93	.89	.86
Paraguay 1972	.70	.65	.73	.74	.68	.65	.71	.73	.71	.66	.75	.75
Paraguay 1982	.77	.72	.80	.82	.76	.71	.78	.80	.79	.73	.81	.84

Table 7. Means of 6-Item and 3-Item Housing Quality Scale for Total Population, by Sex, Age Group and Urban/Rural Residence - Selected Latin American Countries and Times (standard deviations in parantheses)

Country/Time	Total	Sex		Age			Residence	
		Male	Female	0-14	15-59	60+	Urban	Not Urb.
				6-Item Scale				
Argentina 1981	10.42	10.30	10.53	9.81	10.63	11.00	11.06	6.86
	(3.02)	(3.08)	(2.97)	(3.24)	(2.91)	(2.73)	(2.51)	(3.21)
Bolivia 1976	5.87	5.78	5.96	5.69	6.06	5.57	7.40	4.35
	(3.19)	(3.15)	(3.22)	(3.09)	(3.26)	(3.11)	(3.26)	(2.24)
Brazil 1980	9.30	9.21	9.39	8.89	9.59	9.32	10.81	6.71
	(3.06)	(9.21)	(9.39)	(3.05)	(3.03)	(3.13)	(2.31)	(2.41)
Chile 1970	10.24	10.11	10.36	9.92	10.47	10.33	10.84	8.11
	(2.78)	(2.81)	(2.74)	(2.83)	(2.71)	(2.77)	(2.52)	(2.59)
Chile 1982	11.03	10.93	11.14	10.77	11.17	11.10	11.42	9.22
	(2.14)	(2.18)	(2.09)	(2.22)	(2.08)	(2.16)	(1.92)	(2.18)
Colombia 1973	8.95	8.77	9.12	8.59	9.27	8.89	9.93	6.74
	(3.60)	(3.63)	(3.56)	(3.64)	(3.53)	(3.58)	(3.28)	(3.27)
Costa Rica 1973	9.66	9.55	9.78	9.28	9.99	9.84	11.42	8.86
	(3.35)	(3.38)	(3.31)	(3.45)	(3.22)	(3.27)	(2.14)	(3.49)
Costa Rica 1984	10.85	10.79	10.92	10.55	9.68	9.54	10.34	8.49
	(2.58)	(2.61)	(2.45)	(2.53)	(2.50)	(2.55)	(2.10)	(2.79)
Dom. Rep. 1981	7.19	7.07	7.32	6.93	7.40	7.14	8.29	6.49
	(2.98)	(2.97)	(2.98)	(2.95)	(2.99)	(2.99)	(2.93)	(2.79)
Ecuador 1974	6.14	6.00	6.29	5.91	6.34	6.38	8.81	4.84
	(3.30)	(3.24)	(3.35)	(3.19)	(3.38)	(3.34)	(3.18)	(2.47)
Ecuador 1982	6.46	6.33	6.59	6.05	6.76	6.97	9.14	5.31
	(3.53)	(3.49)	(3.57)	(3.39)	(3.61)	(3.56)	(3.36)	(2.93)
Panama 1980	7.94	7.78	8.10	7.51	8.20	8.27	9.79	6.53
	(3.01)	(3.02)	(2.99)	(3.02)	(2.97)	(2.98)	(2.14)	(2.81)
Paraguay 1972	8.41	8.32	8.51	8.09	8.67	8.78	9.17	7.58
	(2.58)	(2.52)	(2.63)	(2.41)	(2.69)	(2.68)	(2.85)	(1.94)
Paraguay 1982	8.03	7.91	8.14	7.55	8.34	8.58	8.09	7.99
	(2.92)	(2.88)	(2.96)	(2.77)	(2.98)	(2.95)	(2.86)	(2.96)

Table 7 continued

Country/Time	Total	Sex		Age			Residence	
		Male	Female	0-14	15-59	60+	Urban	Not Urb.
				3-Item Scale				
Argentina 1981	4.97	4.90	5.03	4.61	5.08	5.33	5.34	2.88
	(1.71)	(1.75)	(1.67)	(1.88)	(1.63)	(1.49)	(1.31	(2.16)
Bolivia 1976	1.93	1.88	1.98	1.81	2.06	1.64	2.87	0.99
	(1.98)	(1.95)	(2.00)	(1.88)	(2.04)	(1.96)	(2.10)	(1.28)
Brazil 1970	2.53	2.46	2.60	2.22	2.74	2.91	3.92	0.79
	(2.39)	(2.37)	(2.41)	(2.27)	(2.43)	(2.53)	(2.14)	(1.30)
Brazil 1980	3.33	3.27	3.39	3.03	3.55	3.26	4.48	1.36
	(2.23)	(2.22)	(2.23)	(2.19)	(2.22)	(2.31)	(1.74)	(1.51)
Chile 1970	4.37	4.28	4.46	4.16	4.52	4.42	4.85	2.67
	(1.91)	(1.94)	(1.88)	(1.95)	(1.86)	(1.93)	(1.65)	(1.82)
Chile 1982	4.94	4.87	5.01	4.78	5.03	4.96	5.23	3.58
	(1.47)	(1.51)	(1.43)	(1.52)	(1.42)	(1.51)	(1.26)	(1.62)
Colombia 1973	3.88	3.76	3.99	3.66	4.07	3.87	4.50	2.48
	(2.29)	(2.32)	(2.27)	(2.32)	(2.25)	(2.31)	(2.04)	(2.22)
Colombia 1985	4.64	4.54	4.73	4.43	4.77	4.56	5.40	3.27
	(2.02)	(2.07)	(1.97)	(2.10)	(1.95)	(2.06)	(1.39)	(2.24)
Costa Rica 1973	4.27	4.20	4.34	4.05	4.45	4.45	5.70	3.68
	(1.92)	(1.94)	(1.89)	(1.98)	(1.85)	(1.85)	(0.80)	(1.98)
Costa Rica 1984	4.97	4.92	5.02	4.79	5.07	5.11	5.55	4.29
	(1.54)	(1.56)	(1.51)	(1.65)	(1.46)	(1.44)	(0.94)	(1.80)
Dom. Rep. 1981	3.93	3.85	4.01	3.77	4.05	3.91	4.58	3.52
	(1.89)	(1.90)	(1.86)	(1.91)	(1.85)	(1.91)	(1.58)	(1.95)
Ecuador 1974	2.16	2.06	2.18	2.00	2.29	2.56	4.11	1.97
	(2.18)	(2.14)	(2.22)	(2.10)	(2.24)	(2.23)	(2.01)	(1.52)
Ecuador 1982	2.50	2.42	2.58	2.24	2.69	2.72	4.27	1.74
	(2.22)	(2.19)	(2.24)	(2.12)	(2.27)	(2.29)	(2.04)	(1.83)
Panama 1980	4.14	4.04	4.24	3.89	4.30	4.27	5.29	3.26
	(1.86)	(1.89)	(1.83)	(1.90)	(1.82)	(1.85)	(1.04)	(1.87)
Paraguay 1972	2.92	2.89	2.96	2.80	3.03	3.05	3.23	2.59
	(1.19)	(1.15)	(1.22)	(1.09)	(1.25)	(1.27)	(1.37)	(0.83)
Paraguay 1982	3.37	3.32	3.42	3.16	3.51	3.57	3.35	3.38
	(1.39)	(1.36)	(1.41)	(1.30)	(1.43)	(1.44)	(1.33)	(1.42)

Table 8. Socio-economic and Housing Quality Indicators for Selected Countries and Years - Latin America

	GNPpc	%Urban	IMR	MS1	MS2
Argentina 1981	1970	83.3	37	10.4	5.0
Bolivia 1976	400	42.1	131	5.9	1.9
Brazil 1970*	500	56.9	95		2.5
1980	2070	66.2	74	9.3	3.3
Chile 1970*	990	75.8	82	10.2	4.4
1982	2190	82.2	24	11.0	4.9
Colombia 1973	430	59.3	70	9.0	3.9
1985	1280	67.0	40		4.6
Costa Rica 1973	750	40.7	45	9.7	4.3
1984	1190	44.5	19	10.9	5.0
Dom. Rep. 1981	1220	51.5	69	7.2	3.9
Ecuador 1974	430	41.8	87	6.1	2.2
1982	1490	48.8	65	6.5	2.5
Panama 1980	1720	49.7	28	7.9	4.1
Paraguay 1972	300	37.9	55	8.4	2.9
1982	1700	42.8	53	8.0	3.4

Source: for 1971-1985 World Tables 1993, World Bank.
for 1970 World Tables 1988-89, World Bank.

* Figure for GNPpc refers to 1971

IMR = Infant Mortality Rate (deaths to infants <1 per 1000 infants that age)

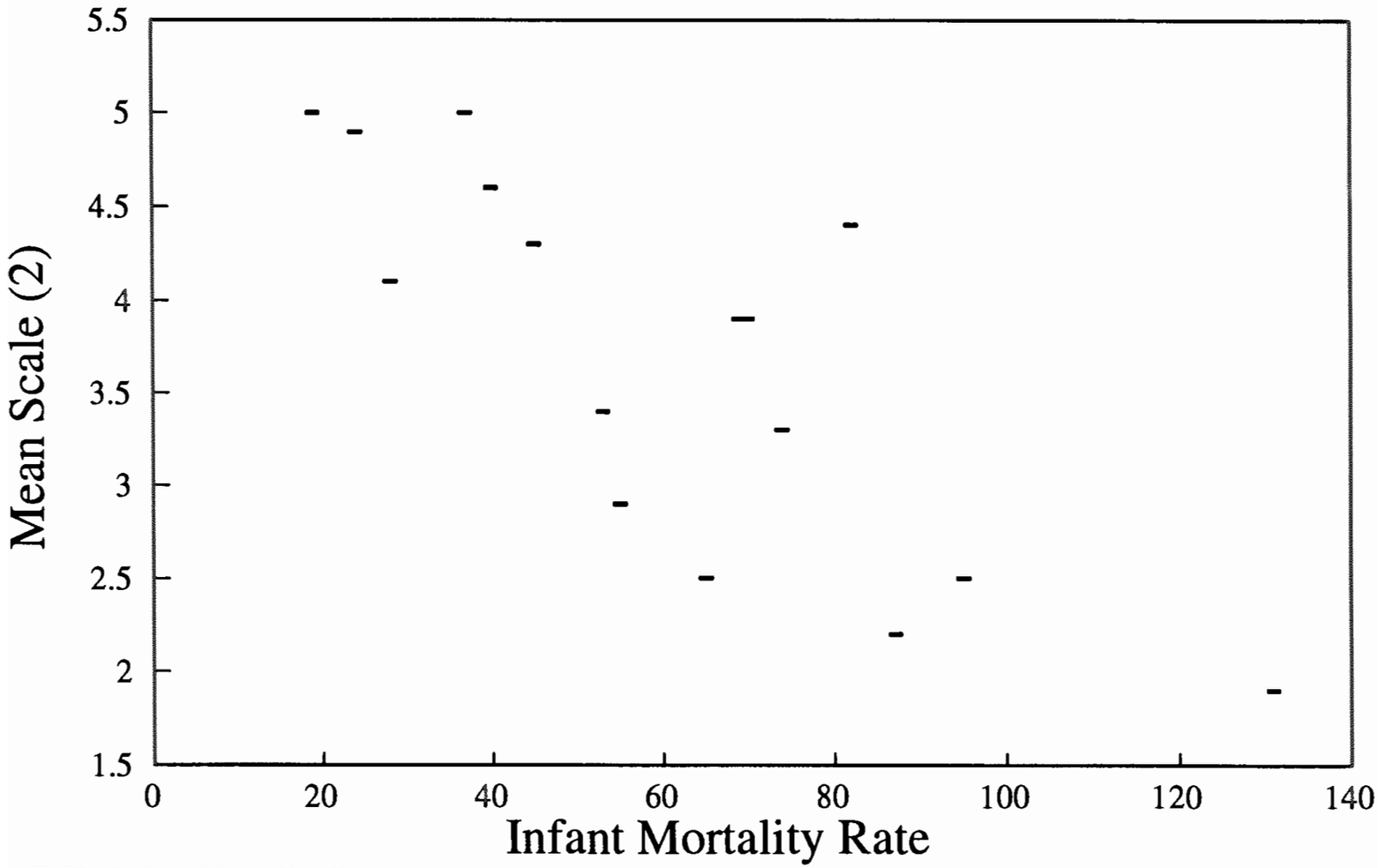
GNPpc = Gross National Product per Capita, in current U.S. dollars (current refers to year data was collected, so that values may not be comparable between World Bank publications)

Urban% = Percent of population living in urban areas

Table 9. Spearman's Correlation of Education and Housing Scales Among Everyone, Men and Women 15-59 Years of Age in Selected Latin American Censuses

	Six Item Scale			Three Item Scale		
	All	Male	Female	All	Male	Female
Argentina 1980	.40	.43	.37	.41	.43	.38
Bolivia 1976	.51	.53	.54	.54	.56	.56
Brazil 1970				.59	.63	.57
Brazil 1980	.48	.51	.46	.50	.53	.48
Chile 1970	.50	.54	.47	.50	.53	.47
Chile 1982	.43	.47	.41	.43	.46	.41
Colombia 1973	.52	.56	.49	.51	.54	.48
Colombia 1985				.47	.49	.44
Costa Rica 1973	.45	.46	.44	.48	.50	.47
Costa Rica 1984	.40	.41	.39	.41	.42	.39
Dom. Rep. 1981	.40	.41	.40	.42	.43	.41
Ecuador 1974	.52	.52	.52	.52	.52	.53
Ecuador 1982	.48	.49	.49	.49	.49	.50
Panama 1980	.53	.55	.50	.55	.57	.54
Paraguay 1972	.43	.44	.43	.39	.40	.39
Paraguay 1982	.38	.37	.39	.37	.36	.38

Figure1. Correlation between IMR and MS2



IMR: Infant Mortality Rate
MS2: Means of three-item Scale

Appendix A

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