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Research on Improving Coverage in Household Surveys

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RESEARCH ON IMPROVING COVERAGE IN HOUSEHOLD SURVEYS

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Abstract
A large differential undercount biases census and survey data collected by the Census Bureau. This paper reviews evidence on magnitude and causes of undercount. A recent ethnographic study and other sources of evidence are used to evaluate two sources of undercount. Undercount results if people deliberately choose not to be counted, or if their living arrangements are incompatible with the Census Bureau concept of "usual residence." Both causes result in biased estimates of important social characteristics. We recommend research in four areas: participant observation studies of causes of undercoverage; research on household structure; comparisons of matched data from the Current Population Survey (CPS) and the census; and research on interviewer training and performance.

Keywords
undercoverage, bias, interviewers, participant-observation

1. Introduction

It is well-known that household surveys and the census do not obtain complete coverage of the population. For some groups coverage is excellent, but for some coverage is quite deficient. Differential coverage means that some age-race-sex groups are not counted as completely as others, and this introduces bias in several ways.

The most obvious bias is distorted information about the numbers and characteristics of the subgroups which are underrepresented. As we will show below, Black men are seriously underrepresented in the census and surveys fielded by the Census Bureau. The result is distorted information about the Black population. For instance, in one small ethnographic study of an inner-city neighborhood, Census Bureau data indicated that 72 percent of households were female-headed, while the ethnographers concluded that only 12 percent were (Valentine and Valentine, 1971). Though this may be an extreme case, the Valentines argued, on the basis of this finding, that biased census data create and support a distorted image of the female-headed Black household, which is "associated with an unstable pathological family life said to play a major role in perpetuating poverty" (1971: 28). This notion may be based on a measurement artifact.

The biasing effect of survey undercoverage on survey statistics depends on two factors. First bias is greater to the extent that undercoverage is high, and the phenomenon of interest (e.g., employment, victimization by crime) is highly concentrated in underrepresented age-race-sex groups. The use of census data to adjust for survey undercoverage only partially corrects for the bias in population estimates of age-race-sex groups, because the census also undercounts the same age-race-sex groups. Since census undercount is substantial, most aggregates are significantly undercounted. For example, census undercount results in an understatement (by at least 2 1/2 million people) of estimated employment levels by the Current Population Survey

(CPS) (Brooks and Bailar, 1978). This effect is pronounced because the census tends to miss men of working age, for whom employment levels are relatively high. Also, the relatively large undercount of Black men should result in under-
estimates of the rates as well as the numbers of crime victimizations for the adult population by the National Crime Survey, because victimization rates are considerably higher for Black men.

Second, undercoverage is biasing to the extent that missing people systematically differ on the characteristic of interest from those who are counted in the same age-race-sex category. This occurs when "missingness" causes, or is caused by, the characteristic in question or a variable related to it. In this case, the effects of undercoverage can be quite pernicious and difficult to detect.

In our paper, we begin by summarizing available evidence on undercoverage in several Census Bureau surveys. For the Current Population Survey (which has better coverage than most of the Bureau's surveys) estimates are that about 7 percent of the total population, and 27 percent of Black males age 20-24, are missed. This is in addition to decennial census undercoverage.

Ethnographic research--including a recent field study by Peter Hainer--suggests two major reasons why people are missed in the census and surveys. In this paper, we only consider reasons why persons in interviewed housing units are missed, not why whole units are missed. Most of the research on undercoverage is based on Blacks, but surveys also miss substantial percentages of Hispanics. One reason people are missed is motivational. Black (and Hispanic) males are deliberately omitted from household rosters because of the potential loss of household income if the men were known to authorities, and/or because of illegal activities by omitted individuals. Mistrust of the Government in general, and of the confidentiality of census data in particular, are major factors which contribute to misreporting. Hainer also finds that some interviewers contribute to undercoverage in order to protect their own work record, which is judged by their success in maintaining response rates in sample households.

A second cause of undercoverage is the lack of fit between the census definitions of household and residency, and people's actual living situations. The Census Bureau has rules for assigning people to addresses in order to cover the population completely and without duplication. This is not always effective. The social organization of Black households in central cities does not fit the Census Bureau assumption of a "usual residence." There tends to be a great deal of transiency and mobility and a person's status as a household member may be uncertain or in dispute. We believe some people are missed for both of these reasons and some for just one of them.

Both causes imply that "missingness" is related to important social character- istics (such as employment status and income source) which the Census Bureau attempts to measure in the census and in surveys. We draw on data from the census and surveys to evaluate the biasing effects of systematic undercoverage, and we offer suggestions for research which could increase our understanding and (we hope) reduce the extent of differential undercoverage.

2. Estimates of Survey Undercoverage

Every month the Census Bureau produces updated population estimates by age, sex, and race, and for Hispanic/non-Hispanic by age and sex. The estimates are based on the most recent decennial census and are revised monthly to account for births, deaths, immigration, emigration, and aging of the population. Data on births and deaths are compiled for the resident population by the National Center for Health Statistics, and data on deaths are compiled for the military population by the Department of Defense and the Coast Guard. Net civilian immigration estimates are based on data provided by the Immigration and Naturalization Service and three other agencies. In most surveys, only the civilian noninstitutional population is of interest. The estimates for this group are derived by subtracting the Armed Forces and the institutionalized population. The institutionalized population is computed by applying institutional proportions (which are at most .06 for any age-sex-race group) derived from the preceding census to the total population. All computations are performed by single year of age, by race, and by sex (Bureau of Labor Statistics, 1987).

These population estimates do not directly include an adjustment for census undercount. However, an adjustment for age differentials is made to ensure that the census undercount rate is approximately constant over time for each age- race-sex group. (See Bureau of Labor Statistics, 1987, for a detailed description of the inflation-deflation methodology used to make the adjustment.) These population estimates are used to assess coverage in household surveys, as discussed in the next section.

a. Current Population Survey Coverage by Age, Sex, and Race

Survey coverage is estimated by calculating the ratio of the survey estimate of the number in a given age-sex-race group to the independent census estimate for that group, adjusted as described above. In producing the CPS estimate, each sample person is weighted inversely by the probability of selection, multiplied by a noninterview adjustment. A ratio of 1.0 means that CPS coverage is equivalent to the coverage in the decennial census. A ratio of .9 means that CPS coverage is 10 percent worse. The noninterview adjustment, applied before CPS coverage ratios are computed, increases the estimates according to the number of noninterviews. A noninterview is a failure to obtain an interview with a person found in the household and believed to be in-scope. Thus, noninterviews do not contribute to CPS coverage ratios being less than 1.0; noninterview rates are calculated separately from coverage rates.[1] Tables 1 and 2 show average CPS coverage ratios by age for 1986 for the total population, and separately for Whites, Blacks, and Hispanics. Overall CPS coverage is about 7 percent worse than the census, with coverage notably worse for the 20-24 age group. Table 1 shows that, for Whites, male coverage is worse than female coverage for all age groups. The table also shows that Black male coverage is much worse than female coverage, and that the 20-24 year old age group continues to be worse. Note that overall undercoverage for Black males is 17 percent worse than the census, and males 20-24 are 27 percent worse. Finally, in Table 2 we see that Hispanic undercoverage appears to be even worse than Black undercoverage: an estimated 20 percent of all Hispanics are missed, compared to 13 percent of Blacks. Overall Hispanic male undercoverage is 23 percent.

TABLE 1: 1986 AVERAGE COVERAGE RATIOS BY AGE FOR CPS

	Total 14+	14-19	20-24	25-44	45-64	65+
Total	.932	.946	.887	.924	.935	.967
White						
Total	.939	.951	.902	.930	.941	.972
Male	.925	.950	.885	.914	.936	.946
Female	.950	.951	.919	.946	.946	.986
Black						
Total	.874	.904	.778	.856	.884	.946
Male	.833	.884	.733	.805	.861	.927
Female	.907	.924	.820	.910	.906	.956

TABLE 2: 1986 AVERAGE COVERAGE RATIOS FOR HISPANICS BY AGE AND SEX FOR CPS

	Total 14+	14-19	20-29	30-49	50+
Total	.798	.845	.769	.808	.800
Male	.773	.870	.731	.762	.782
Female	.823	.820	.792	.853	.816

Figure 1 shows coverage ratios for CPS over time for several sex-race groups. All ratios are shown using independent population estimates based on 1970 census figures. (If 1980 census figures were used for some years, the differences in coverage between the 1970 and 1980 census would show false trends.) Overall coverage apparently declined between 1975 and 1978, but has been quite stable in other periods since 1966. Male coverage has been consistently somewhat worse than female coverage but has moved up and down in parallel with female coverage. The year 1986 appears to be an exception to this, as male coverage declined while there is no evidence of decline in female coverage.

[FIGURE 1 HERE]

Non-White male coverage ratios declined from 1968 to 1974, then increased substantially to 1980, then gradually declined again. Non-Whites include Blacks, American Indians and Alaska natives, Asians and other smaller racial groups. The non-White male and Black male coverage ratios are very similar to each other, as expected, for 1974-1977, but have greatly diverged after that. The divergence in 1978-1980 resulted from a procedural change. Prior to 1978, CPS interviewers determined race by observation, but since then have asked about the race of each household member. Between 1970 and 1980, there was a tremendous increase in the number of people identifying their race as "American Indian" (Passel and Berman, 1986). The procedural change, coupled with the growth in Indian self-identification, probably contributed to an overcount of this group in CPS relative to 1970 census controls. Thus, non-White male coverage shows apparent improvements during the 1978-1980 period, but Black male coverage was not affected by the procedural change and has been generally declining for a number of years.

b. Comparisons Between Surveys

CPS has better coverage than National Crime Survey (NCS), Health Interview Survey (HIS), and Consumer Expenditure Survey (CE). Overall coverage appears to be worst for CE, estimated to be 5 percent lower than CPS, although only 1984 data are available for this comparison.

Cahoon (1980) compares CPS and NCS coverage for 1973-1979 and finds that overall coverage was on average 1 1/2 to 2 percent better for CPS throughout the period. Figure 1 shows that CPS coverage of non-White males was improving from 1973 to 1979, while NCS coverage of this group worsened slightly. Thus, in 1973 coverage was 2 1/2 percent better in CPS, but in 1978 it was about 6 percent better.

Knowles (1980) compares CPS and HIS coverage for 1973-1978, and reports that on average coverage was about 1 percent better in CPS each year.

Survey of Income and Program Participation (SIPP) coverage rates are available only for March 1984 and March 1986. There is no evidence from this data that SIPP and CPS differ much in coverage (King et al., 1987, and unpublished data).

c. Characteristics of People Missed in Surveys

Let us reiterate that survey undercoverage is in addition to decennial census undercoverage, which in 1980 was estimated to be about 1 percent overall and about 8.5 percent for Black males, according to demographic analysis (Fay, Passel, and Robinson, 1988). Thus, accounting for census undercoverage yields the following undercoverage rates for CPS: 8 percent for the total population 14 and over, 25 percent for Black males 14 and over, at least 34 percent for Black males 20-24, and probably worse than 31 percent for Hispanic males. Difficulties in estimating illegal aliens may mean that Hispanic coverage is even worse.

We suspect that people who are consistently missed in both the census and the surveys tend to be missed for different reasons, and have different characteristics than people who are counted in one but not the other. Little is known about people missed in both the census and surveys, although it is known that a large number of adult Black men are systematically missed.

The CPS-Census match file is being analyzed to learn more about people who were missed in CPS households interviewed in April 1980 but who were included in the 1980 Decennial Census. Preliminary results show that people who were missed in interviewed CPS housing units but counted in the census tend to be concentrated in the following categories: men, sons or daughters of the household head, persons aged 15-29, roomer/boarders, partner/roommates, children under 1, and "other relatives" under 30 ("other relatives" includes relatives whose relation to the household head is not spouse, child, sibling, or parent).

d. Within Housing Unit and Total Housing Unit Undercoverage

One question of interest is how much undercoverage is due to missed housing units, and how much is due to people missed within counted units. For house- hold surveys, this issue has been addressed only for the National Crime Survey (NCS). Compared to the 1980 census, the NCS has about 10 percent lower coverage of persons 12 and over, and about 6 percent lower coverage of housing units. "Since smaller housing units are probably the most likely to be missed, the proportion of persons lost due to [whole] household undercoverage is probably less than 6 percent. This leaves at least 4 percent and probably more to be attributed to within-household undercoverage" (Alexander, 1986). Missed units are likely to be small, out-of-the-way units, which are harder to locate than large units. Comparisons for Black housing unit coverage are not available. However, Black female undercoverage is very close to overall under-coverage whereas Black male undercoverage is about 20 percent. This suggests that much of the Black undercoverage is within housing units, although it could conceivably be due to missing whole units consisting primarily of Black men.

e. Coverage by Month-in-Sample

In most Census Bureau surveys, households are interviewed several times over a period of months or years. In the CPS, for example, a household is interviewed monthly for 4 months, rested for 8 months, and interviewed for 4 months. Table 3 provides CPS data on how coverage varies by time in sample, averaged over seven rotation groups of data. Coverage declines a bit as households remain in sample, and the deterioration is worse for non-Whites. For Whites, coverage is .016 worse the eighth month in sample than the first month in sample. For non-Whites, coverage is .025 worse the eighth month in sample than the first month in sample. What presumably happens is that people leaving a household are correctly identified, but new people entering a household are not always recorded on the roster.

TABLE 3: COVERAGE RATIOS BY MONTH-IN-SAMPLE FOR SEVEN CPS ROTATION GROUPS, APRIL 1979 - JULY 1980

	Month-in-Sample								
	1	2	3	4	5	6	7	8	Full Sample
White	.970	.971	.971	.964	.962	.960	.957	.954	.963
Non-White	.963	.964	.957	.961	.950	.949	.946	.938	.954

The data in Table 3 imply that coverage could be improved by reducing the length of time units are in sample. It is important to note that coverage differentials between non-Whites and Whites increase with increasing time in sample.

3. Motivational Causes of Undercoverage

We discuss two reasons for undercoverage, each of which we believe accounts for a significant portion of the undercount. In this section, we discuss deliberate omissions to protect household income and suppress official knowledge of illegal activities. In section 4, we discuss omissions due to the lack of fit between census residency rules and people's actual living situations.

a. Evidence from Studies of Census Undercount

For at least 40 years the Census Bureau has conducted extensive research on causes of undercoverage in the census. Data have accumulated to indicate the characteristics of persons likely to be missed, and probable motives for incomplete reporting. Information is not yet sufficient to indicate what component of coverage error is accounted for by specific causes.

The Census Bureau's early hypotheses about the motivational causes of undercoverage were inferred from the characteristics of the populations in which the problem was greatest. The first Post Enumeration Survey (a sample of housing units interviewed after the census and matched to the census count) followed the 1950 census and identified "relatively high deficiencies of young non-White males" in the count (Pritzker and Rothwell, 1967). The 1950 Post Enumeration Survey (PES) estimated that 3.3 percent of non-Whites were missed, versus 1.2 percent of Whites.

The PES program in 1960 produced stronger evidence that coverage was worse for non-Whites. It also indicated that most non-White people who were missed in the census did not live in dwellings that were missed. (In contrast, most Whites who were missed lived in missed dwellings.) This suggests either that the missing non-Whites did not reside anyplace, or that they were unreported at the places they did reside. In 1960 there was also a substantial difference in the sex ratio for ages 20-44 by race. The census counted 97.1 White men for each 100 women in this age range, compared to 87.1 non-White men for each 100 women (Pritzker and Rothwell, 1967).

During the 1960's, in an effort to understand the differential undercount, the Bureau analyzed the enumeration procedures themselves. In 1960, 98 percent of district offices had completed census enumeration by the end of April, but 2 percent required an additional 3 months to complete the census (Pritzker and Rothwell, 1967). The hard-to-enumerate 2 percent were in such cities as New York, Los Angeles, and Chicago, with high non-White populations. These cities also had the highest rates of enumerator turnover, and in debriefing inter- views, enumerators indicated that they encountered fear, intimidation, suspicion, "sullenness and vituperative hostility" from respondents (Pritzker and Rothwell, 1967).

In 1964 the Bureau tested procedures for conducting the census by mail. The mailout, mailback method, together with U.S. Postal Service checks for missed households, reduced undercount for all components of the population except Black men (Pritzker and Rothwell, 1967). The resistance to procedural improve- ment indicated that undercoverage in this subpopulation could be caused by motivational factors.

Based on this hypothesis, in the late 1960's the Bureau introduced various programs to improve coverage, including consultation with community leaders, to try to change perceptions about the census and to improve reporting. However, debriefings with experienced field staff indicated the Bureau faced almost intractable problems in the inner-city. "All people seem to have some reason for concealment" (Rothwell, 1967). Respondents suppressed reports of household members to avoid possible disclosure of violations of housing codes, rental contracts, welfare restrictions, and criminal statutes. Enumerators and crew leaders working in these areas attributed most underenumeration to fears about loss of home or livelihood. They cited numerous examples, and a few enumerators in the Philadelphia study even stated that they would not report some members of their own households.

In 1967 the Bureau began experimenting with different questionnaire formats to improve coverage of Black men. Enumerators concluded they had more impact on coverage when they were able to persuade respondents that the census data were confidential and important to the respondent's welfare (Rothwell, 1967).

Perhaps due to the various coverage improvement programs introduced in each successive census, coverage improved for all sex-race groups of the population between 1940 and 1980, as Figure 2 shows. However, as Figure 2 also shows, differential coverage was scarcely affected, and coverage remained far worse for Blacks, especially men.

[FIGURE 2 HERE]

Demographic analysis and post enumeration surveys (PES)[2] agreed as to the direction, but not the magnitude of the undercoverage problem. The PES results do not reveal the much higher census underenumeration rates for Black men shown by demographic analysis. The post census surveys shared the census bias toward undercoverage of Black males. This can be seen clearly in Figures 3a-c, which show that in the past three censuses, very large numbers of adult Black men were not found in either the PES or in the census, although there is record of their existence (e.g., from birth records). Once again, the consistency with which they were missed suggests that systematic avoidance may be involved.

[FIGURE 31-C HERE]

Because of the shared bias, known as correlation bias, the PES cannot tell us the characteristics of the large number of Black men who are missed in both the PES and the census. However, there were reports of successful long-term participant observation field studies among populations which were difficult to find in surveys. In 1968 and 1969 the Bureau cosponsored field research in an urban Northeastern Black neighborhood. The hope was that anthropological research could provide a better understanding of behavioral and motivational factors associated with undercoverage. The first study was conducted by Charles and Betty Lou Valentine, who produced the best evidence that household members were systematically hidden from the Census Bureau.

In a blind comparison the Valentines matched the household rosters case by case in 25 units they knew well against reports given to Census Bureau interviewers. The Valentines estimated that the Bureau count was 17 percent below the actual number of residents, and that for males over 19 years old, the Bureau missed 61 percent of those actually present. As noted earlier, Census Bureau data indicated that 72 percent of the households were female-headed, while the ethnographers found only 12 percent actually lacked an adult male partner. The actual sex ratio based on observations in these households was almost 1:1.

The Valentines concluded "the overwhelming weight of the evidence indicates that the respondents simply chose to omit certain key individuals from their answers" (Valentine and Valentine, 1971: 17). Most respondents were women, and three fourths failed to report male residents. The only exceptions were two female respondents with clear motives to respond truthfully (for instance, one served as a foster parent, a role that required the presence of an adult male).

The Valentines applied their knowledge of the families and their circumstances to explain the powerful motives for incomplete reporting. The first motive they cited was economic. Eighty-one percent of the households they studied received public assistance, and nearly all benefitted from the market in stolen goods. Household economies could only be maintained

through suppression of any official knowledge about illegal behaviors, resulting in a universal wariness. Promises of confidentiality were not believed. People in these neighborhoods held the widespread view that both Government and commercial organizations routinely share data. (This finding has been encountered in many Bureau studies, including the most recent.)

The Valentines found that no household in a position to lose significant amounts of income by disclosing the presence of productive males reported these family members to the Census interviewers. These men were not transient, and it was unlikely that they could be counted through changes in procedures aimed at finding persons who were highly mobile. The Valentines described, instead, a population "consistent and united in its unwillingness to make certain disclosures," because of beliefs about who might see any information they disclose (Valentine and Valentine, 1971: 24-25).

In the 1970's there were serious reservations about the study, which was not widely disseminated. The Valentines were reluctant to have their research used to make conditions even more difficult for the people they studied. Bureau researchers were reluctant to rely on what appeared to be an unverifiable method. Taken together over time, however, the results of participant observer studies of coverage have been so consistent that the method has been well accepted as an adjunct to statistical studies of coverage.

A second anthropological study (Harwood, 1970) identified welfare restrictions as a factor contributing to undercount in a Puerto Rican community, as well. In the neighborhood Harwood studied, survey interviews (not conducted by the Census Bureau) in almost 5,000 households showed 67 percent of the households to be female headed. Based on his own observations, he believed that only 38 percent of these households were actually female headed. Harwood concluded that at least 29 percent of the males over age 20 had not been reported to the interviewers, and he pointed out that this rate was very close to the propor- tion of families containing a male who was not reported to welfare authorities (22 percent). He concluded that "the discrepancy between census reporting and observation could be traced to welfare regulations" (Harwood, 1970: 3-4). He did not match individual cases, however, so it is unknown whether the families on welfare were the same households failing to report men to survey inter- viewers.

In 1986 three participant observers studied Hispanic neighborhoods during the Los Angeles test census, and found that distrust of data confidentiality was an important source of coverage error in this population as well. They found a number of people missed in the census whose families were receiving public welfare payments, and their reluctance to be counted was attributed to a fear of jeopardizing recipiency status (Hines, 1987a).

In addition to motives related to eligibility for welfare, many Hispanics have another motive to hide household members: fear of deportation for those here illegally. Immigrant and welfare households were also frequently living in dwelling units which the Bureau never found (Hines, 1987a). When the missed households are eliminated, however, most coverage error in these neighborhoods was attributed to fear, motivated either by undocumented status or welfare dependency (Vigil, 1987; Garcia, 1987).

The hypothesis that undercoverage is motivated by concerns about welfare eligibility raises the question of whether there are enough Black AFDC (Aid to Families with Dependent Children) cases to account for a significant amount of Black male undercoverage. According to unpublished data from Family Support Administration, Office of Policy Planning, Department of Health and Human Services, there was a monthly average of about 1,500,000 Black AFDC cases in 1986. Assuming that each female receiving AFDC has a male partner, this represents about 17 percent of all Black males age 16 and over in 1986, which is sufficiently high to account for a significant portion of Black male undercoverage. (As noted earlier, estimated Black male undercoverage in CPS, including census undercoverage, is 25 percent.) However, other evidence suggests the relationship between welfare eligibility requirements and undercoverage is complex.

A 1968 study analyzed the relationship between state welfare restrictions on the presence of men and rates of undercoverage. States with large Black populations were categorized according to whether they had strict or lenient rules prohibiting the presence of employable adult males in households receiving welfare. Sex ratios for non-White males were significantly lower in strict states, indicating fewer males were counted. This relationship was also true in 1910, however, before such welfare rules were instituted (Jacoby and Novoa, 1969). There was no effort made to measure the level of enforcement in any of these states.

Moreover, to the extent that undercoverage is motivated by respondents' fears about reporting men to authorities, one might expect higher rates of under- coverage to be associated with more female-headed households. Although CPS has worse coverage than the decennial census, it apparently does not have a higher proportion of female-headed households, according to Shapiro's (1979) compari- son of March 1970 CPS and 1970 census data.

Negative public attitudes about data confidentiality persist, according to results of a national survey conducted after the 1980 census (Moore, 1982), and focus groups conducted after test censuses in 1985-87. This is despite the Bureau's network of staff and programs designed to reach hard-to-enumerate populations and convince them that census data are confidential and important.

Attitudes about the census and data confidentiality appear to be conditioned by more general attitudes toward the Government. Characteristics which are associated with high rates of undercoverage (race and sex, for example) are also associated with greater mistrust of the Government in general. Focus group discussions indicate that many people do not have a clear concept of the Census Bureau as an independent agency. Rather, many people view Government as a monolithic, remote, and hostile entity which uses information to hurt the people who provide it (see Bailar and Martin, 1987). Census Bureau promises of data confidentiality can be undermined by generalized mistrust and suspicion of the Government.

According to the 1980 survey, only about half of all respondents believed that no one outside the Census Bureau could see their answers (Moore, 1982). Blacks were less likely than Whites to trust the confidentiality of census data, and much more likely to see the census as an invasion of privacy. In general, Blacks and Hispanics were significantly more likely than Whites to believe that census information is used by the Government against individuals--for instance, to find

illegal residents. Similarly, focus group participants believed the Government uses data to catch individuals who are "cheating," by comparing data and records between departments (Market Dynamics, 1986). Focus groups conducted after the Mississippi test census indicated that people were concerned about data confidentiality because they feared local Bureau employees couldn't be trusted, computers were not secure, and Government agencies share information (Riva, 1985).

b. Motives for Suppression: Evidence from Hainer's Field Research

As will be discussed below, formal surveys make simplifying assumptions about people's residential arrangements. These assumptions may not fit the internal structure of low-income urban Black households (or other racial and ethnic groups). Central to understanding undercoverage in the Black community is knowing that Black people operate in two social systems. One is their own internal social system, and the other is the largely White middle-class world around them. The problems created by biculturalism and variation in the social organization of households are documented in Hainer's recent ethnographic research. He has been conducting ethnographic research in low-income Black neighborhoods of Boston for nearly 20 years. In 1970 he observed the role of indigenous census enumerators in perpetuating errors in the decennial counts of households in these neighborhoods (Hainer, 1985).

In 1986 and 1987 he conducted a study for the Census Bureau to explore factors influencing CPS coverage, especially of Black males. Hainer (1987) conducted intensive interviews with his long term informants, focussing on ways to increase the perception of confidentiality, and thereby increase people's willingness to give more valid information about their actual living conditions. Hainer also observed interviewing in order to gather evidence about causes of undercoverage in Census Bureau surveys.

Hainer found that if family income is derived from public or welfare sources, the respondent will only report information about the structure and membership of the household which is consistent with the "official" record reported to the social service department responsible for payment. These household membership reports are made to maximize sources of steady and reliable income. Informants repeatedly indicated such discrepancies between "official" and actual household composition, and were curious that anyone would believe that it would work any other way. This is, of course, the Valentine and Valentine (1971) argument, and the observation Hainer made during the 1970 census, when he watched local enumerators counting "addresses" in an apartment building and talking among themselves about how the occupants of the "address" units should be recorded officially (Hainer, 1985).

An example from Hainer`s research shows the power of the forces toward concealment. One of Hainer's informants, Ernestine,[3] was surprised when asked why people would not cooperate in providing information about their families. She said everybody reports only what they have reported to the welfare department. Ernestine recalled an incident that occurred when she was married to Jesse, who was not the biological father of her two daughters, but was acting the role of social father and Ernestine's husband. Jesse had a job, though low-paying, and resented never being included as Ernestine's husband whenever she filled out a form even though they were "living together as a family." She described her dilemma:

> He (Jesse) forever be on my ass...about how he was never included nowhere, no place. We go to the hospital with one of the kids and he know all about the child and be telling the nurse this and that about the child, what she be eating, and how she be sick and then the nurse asks for the information I just put my name down. He used to get real mad about it. He used to say you never put me down and I am your husband. He knew I couldn't afford to put his name down and screw up my welfare check. But, he was the same everywhere we went. One day we had a fight and he got so pissed off he took our marriage certificate and went to the social worker at the welfare and showed her we was married ... . First they throwed me off welfare. No, first I throwed his ass out of the house, then they throwed me off welfare, then I reapplied as a deserted woman with kids, saying he'd abandoned us. I got put on again, but by the time the whole deal went down I'd lost 6 weeks (of benefits) and had to struggle, just because of the bullshit of that man. I wouldn't let his ass around after that ... . I really loved his ass too, but I wouldn't let him in my house again after that. I couldn't afford to have him around and not be able to trust his ass.

Ernestine's concern was not only maintaining a consistent "paper trail" (welfare should correspond with hospital, with school, etc.), but with maintaining a relationship with a family member who could not maintain that same presentation in public. Membership in the family means playing the appropriate role, and also agreeing to share certain assumptions about how the family will be presented to the outside world. Failure to do so threatens the economic resources of the family, and membership in the family itself.

There are two elements present in this story: first, welfare eligibility and the problem of retaining a husband or boyfriend as a coresident member of the same apartment address; and second, sharing expectations for appropriate role performance within the family group. Had Ernestine's husband been a consistent and predictable role player he would have been present at the apartment address, but simply not reported as such.

Protecting "family business," information about how families are constituted, is very important. Children are taught to "act ignorant" and pretend they don't know anything when they talk to anyone outside of the family.

Hainer's informants were unanimous in their view that virtually any question that was linked to anyone's name was "too personal" and threatening. Informants made the link from name to questions about boyfriends and illegal support. Defensiveness was virtually universal among Hainer's informants, and simple, apparently benign, questions led in their minds directly to domains of information they felt were important, potentially dangerous if misused, and "personal," that is, information that left them vulnerable. The only sort of household roster which they thought <u>might</u> be acceptable would be crude categories. Specifically, people said they might answer if they were asked only, "How many people live here, and what are their sexes and ages?" Again and again Hainer was told, "No names, tell them, no names."

Perceptions of data confidentiality are affected by factors outside the Bureau's control. The

Bureau is not the only formal institution that does a census. In Boston, the police annually generate a "police list," that is used for a variety of purposes, especially to establish the residential validity of voting lists. The police rookies or cadets usually do the leg work, always in uniform, and to informants, police uniforms are threatening and indicate potential trouble. When Hainer accompanied CPS interviewers, respondents had to be persuaded that this was the Census Bureau, not the police. Laughter greeted interviewers' assurances that Bureau data are confidential. To a person, none of the informants thought that the information given to the Bureau would remain truly confidential.

Part of the problem was caused by confusion between the actual recording of individual information on a form and the use of the data from that form. Informants believed that information about them from their forms is stored in "some computer" somewhere, where someone at some time can get at it. Informants assumed that any information given to one source is shared by all others. Social security numbers (which were collected during the months Hainer observed the CPS) were proof of the systematic ability to track people by using the same number used to register for work, welfare, and a driver's license. Recording this number was proof positive to Hainer's informants that the information asked for was not confidential.

A recent study of coverage in telephone surveys tends to support the hypothesis that anonymity would improve the completeness of within household reporting. In randomly dialed telephone interviews where names are not collected, sex ratios show an improvement in the reporting of Black males (Maklan and Waksberg 1987).

4. Undercoverage Due to Lack of Fit of the Census Bureau's Household and Residency Concepts

Some coverage errors are related to fundamental differences in cultural assumptions about household structure between respondents and the Bureau. In these cases, nonreporting is not purposeful, but a result of widely shared cultural beliefs and practices related to family membership. These coverage problems are not caused by negative attitudes toward the Bureau, so they are not susceptible to campaigns based on persuasion, information, or promotion. Some of the coverage error may be related to fairly simple sources of misunderstanding, which could be corrected by more comprehensible question wording and careful definition of concepts. Small-scale pretests indicated respondents did not use the same definitions the Bureau does for residence (see Shapiro, 1986). Other coverage error seems to be related to fundamental differences in language or behavior. To solve culturally related coverage problems, the Bureau will have to modify operations or definitions to match the reality of local behaviors. The features of household structure and behavior which affect coverage (and the quality of statistical estimates) are relation- ship to an address, replicability of response, and residential stability for the purpose of repetition over time. For the purposes of survey operations or survey estimates, the ideal household would have complete congruence between address, family membership, and residence. The great majority of households that the Bureau contacts come reasonably close to this ideal. For the low- income urban Black families described in Hainer's research and for some other subpopulations the fit between actual structure and the presuppositions that underlie Bureau household survey methods is much poorer. Table 4 summarizes how Census Bureau assumptions deviate from the actual situation for Black and undocumented Hispanic households

(see Hines, 1987b, for further discussion of these and other groups).

[TABLE 4 HERE]

In order to cover the entire population completely and without duplication, there must be rules for assigning each person to an address. The Census Bureau attempts to assign each person to a "usual residence," defined as the place where a person lives and sleeps most of the time. When this rule does not fit real situations, then coverage errors result. A particularly problematic category is persons who have tenuous or irregular ties with one or more house- holds, but do not "usually" live anywhere. The Valentines found a number of men "who are sufficiently unattached or intermittent in their domestic affiliations so that it would be doubtful to assign them to any particular domicile" (1971: 9). Census Bureau interviewers are instructed to count people who have no usual residence elsewhere as residents of the place they are staying. However, in the households studied by the Valentines, the unattached men were not reported to Census Bureau interviewers and most of these probably would have been missed at their other "residences" as well. (The Valentines did not include these unattached men in their estimate of people missed by the Census Bureau.) Many, if not most, such persons would be missed even if none of the motivational factors discussed earlier were involved, because they do not have a "usual residence."

Other evidence corroborates that men missed in the census have more tenuous ties to households and are more mobile. In one study, men were interviewed in casual settings, such as bars, poolrooms, on street corners, and in parks. Their names and addresses were matched to a test census to compare men who were counted with those who were missed. Men who were missed in the census were younger, less likely to be married, and had more changes of residence in the previous year than men who were counted (Klein, 1970).

People may deviate from the assumption of a "usual residence" in several ways. The following characteristics of Black inner-city households have been identified by participant observers:

- People frequently "live" at two or more addresses simultaneously;
- household membership is a subject of disagreement even among members of a coresident group (i.e., some "members" refuse to acknowledge other "members"); and
- people enter and leave households frequently and rapidly (Aschenbrenner, 1975; Hainer, 1985, 1987; Stack, 1974).

a. The Bicultural Problem

As noted earlier, biculturalism is the key to understanding the discrepancy between the census definition of household and people's actual living arrangements. Hainer explored the duality of the Black social system and the middle-class world in his recent field research by considering

which "folk" vocabulary or categories are used for households and the arrangement of people, and how people present their social organization on various bureaucratic records.

Earlier work by Stack (1974), Aschenbrenner (1975), and others suggests that Black families can best be seen as large, loosely structured networks of kin and nonkin alike, who share resources, time, and space. "Family," then, is a group of people who share membership in a domestic group, and is an exchange network. Residence is not coterminous with "address." People may live in the same apartment or house, or they may instead live close by (close enough for daily interaction). Family members share clothes, store them in each of the various apartment "addresses" shared by the family, and generally eat at the address of the family household head, usually an older Black woman. Additionally, Hainer has found that blood relationship, or consanguinity, is not as important as the performance of a family role in determining membership in the "family." For example, it does not matter that a man or woman is the "natural" (biological) parent of a child if he or she behaves in a manner consistent with role expectations. Likewise, a blood relative who does not behave in expected ways can lose his or her status in the family. One can be an ex-mother or ex-father in this system.

Hainer observed that when the CPS interviewer asks about who lives at a sample address, some respondents appear to interpret this as asking about their "family." As described above, "family" refers to an extended domestic unit, and does not correspond to a Census-defined family or household. The respondent expects to be misunderstood if he or she tries to be accurate about the ambiguities of the actual household situation, and therefore allows the interviewer to misunderstand. The result is often a "working misunderstanding" between respondents and interviewers which persists because nothing occurs to inform either party that their assumptions are in error (see Bohannan, 1964). This bicultural problem occurs repeatedly, often daily, for low-income Blacks, and they develop systematic ways of responding to queries (especially official queries), such as the pattern of suppression described above.

b. Household Composition, the Developmental Cycle, and Transiency

According to Hainer's data, additional factors affect decisions about membership in the family. Children, many from within the family and some from without, are raised by an older woman who is the center of the family. The children will "officially" be recorded as residing with various other adults in apartments around the family spatial locus, the apartment of this older woman. Women manage their official addresses, and those of their children, in order to maximize subsidized income.

While children are small this arrangement works very well, with adult men and women playing roles of husbands and wives and brothers and sisters, sharing resources, and supporting the "grandmother" who cares for the children. The adult men and women move in and out of the family at irregular intervals. Every adult is expected to contribute in some way to the resources of the family. When children grow older these arrangements become harder to maintain, as does the stability of the consensual family. As girls and boys mature into adults, with all of the changes in role expectations that go along with adult status, the family itself changes.

Girls are an asset to the family for several reasons. They generally are less aggressive and easier to have around, and they provide child care and do household chores. Second, girls generate assets for the family when they have children, which increases the welfare subsidy for the family. When a girl gets pregnant at 15 or 16, she can present herself to the welfare department as homeless or thrown out of the house. She then receives higher benefits which she can share with her family. She can maintain a separate residence by arranging to have a friend take her mail at a different "address." Eventually, women move out into their own apartments, but usually maintain family membership and contribute income to the family through the family sponsor/household head.

Boys, on the other hand, become a liability as they grow into maturity. They must either begin to provide support to the family or fend for themselves. The price young men pay for failure to get a reliable source of income is eviction from their families. Lack of available jobs is also a factor that motivates young men to get involved with hustling and illegal activities. Boys get rowdy and aggressive and "wants to stay on the corner or out all night, and starts to get involved in drugs, and stealing..." as one informant put it. She lamented that that was the way with boys. "In fact, now that you mention it, I just threw my grandson's ass right on the street the other day. He just be gettin' too much to handle, just like Clarence. I put his ass out too. In fact (laughs) I put jus' about all their asses out, 'cept Willie (referring to her 6 sons)." Although her 15 year old grandson no longer lived with her, she affirmed that she was still counting him as a member of her household to the welfare department, and would until his 18th birthday. This boy would probably be recorded as a household member in a Bureau survey, even though he does not actually live there. This is consistent with the data in Table 1 and Figure 3, which show that coverage is relatively high for the 14-19 age group.

The pattern is that young men are part of the family until they become 15-17 years old, and then leave or are thrown out. They reappear later as husbands or other contributors to household/ families, but not in a capacity that allows their presence to be formally acknowledged.

Adult men are predictably hard to track officially. They are either staying within one family for a while as a nonreported member or living between families, "on the street." Adult women, although often stable as members of families, can be transient as well. Some women leave their children with the household head and "disappear" for stretches of time. Sometimes people leave to temporarily pursue alternate life styles in the street culture, hustling activities, or drug or alcohol addiction. Sometimes welfare regulations make it more profitable for a young woman to move out "officially."

This rapid and frequent movement of people at a particular address is not unusual, or terribly disrupting to the social order. The family and household resides in a cluster of apartments in close proximity. On any given day members of the family might shift their particular residence around in this cluster. For example, one day during this research, there were 16 people who could be said to be "living" at the address of one of Hainer's informants. They had all slept there the previous night, all had eaten there, and all had some clothes there. The next night the number might rise or it might fall, depending on which family members chose to stay at that particular address.

Clearly some of the members of this household are more permanent than others. Older women and younger children are the most stable and most likely to appear repeatedly in any systematic count over time. Young women are likely to be more transient, and young men are even more transient.

c. Internal Composition and Consensus about Family Membership

As transience and the developmental cycle can alter the composition of the family, so too can internal disagreements about the composition of the family. People can and do disagree about who is in the family and who is not, and thus they do not always "know" the correct answers about household composition. They also may contest the membership of an individual.

Internal household membership is a matter of sponsorship and role performance. To be a member of a "family" and share in the activities of the household a person must be accepted by the head of the household, who is usually an older woman. To stay in a household a person must provide resources and services and play a useful and appropriate role. Members who meet the two criteria from the standpoint of the household head do not always meet with the approval of others in the "family." There can be internal disagreement as to who is and is not a member of the household. This means that even if one could assume that people would report honestly to a census interviewer, the interviewer might get different accounts of the household roster by asking different respondents.

This implies there is good reason to suspect the reliability of proxy responses from these households. If individuals do not agree among themselves as to who is a "member" of their family, proxies cannot be fully reliable about household rosters. The temporary nature of household membership for some individuals also indicates that not all household members can be knowledgeable proxies.

The data in Hainer's study suggest that, even under the best of circumstances-- with honest cooperation from respondents--the problems presented by bicultur- alism and the internal social organization of the family and household would be very difficult to surmount for anyone trying to document these social arrange- ments in any formal survey.

5. The Role of the Interviewer

Some of the most interesting data from Hainer's research were generated talking with local interviewers. As a group, local interviewers are hard working, dedicated employees who face enormous difficulties getting people to give valid information. In addition to the problems of mistrust and concern for confidentiality felt by many respondents, local interviewers face an added burden imposed as the Bureau attempts to exercise quality control over their work, particularly the use of interview response rates to evaluate interviewer performance. Hainer's work revealed some of these problems, readily acknowledged and discussed by interviewers themselves. Two noninterview rate measures are used to track interviewer performance. The primary measure is a household

noninterview rate, for whole households. A second measure used in some surveys, but not CPS, is a person noninterview rate, for people who are eligible but are not interviewed within interviewed households. Hainer's observations revealed that performance criteria such as these can discourage interviewers from including all eligible persons on the household roster.

CPS interviewer error rates are based on the number of persons listed on the current questionnaire for whom no labor force data are collected. Theoretically, hard-to-find persons with whom proxy interviews are not possible might be listed only on the control card, without affecting measures of interviewer performance. But this option is admittedly seldom described to interviewers, for fear that they will not try as hard to complete interviews if they know of it.

One interviewer observed by Hainer angrily explained that she gets evaluated each month on the basis of the percentage of the successful interviews she gets with her named people and addresses. If she cannot find someone, her percentage drops. If it drops too much then she receives what this interviewer called a "scold sheet" or "chiding letter" from her supervisor. These procedures have been modified since Hainer's observations, and field staff has placed more emphasis on feedback and support for interviewers. In addition, a program will be conducted in several cities to allow field managers to consider local conditions when setting performance standards. But at the time of Hainer's observations, the existence of formal administrative records of nonresponse did affect whether some interviewers reported persons who were difficult to contact. If interviewers choose to count transient individuals they face more work, and they may be penalized for failure. If they choose to ignore transients, they have eliminated a potential problem, but have contributed to coverage error.

Hainer observed this happening when he and a CPS interviewer visited a CPS sample household. The control card listed a single family house, with a retired couple. When asked about other residents the man responded, "Well there is so-and-so in the basement. He's a boarder, a tenant, but he's never here. Do we have to count him too?" The interviewer said yes, but did not seem to record the information with great interest. She asked when she might find him and was told again, "He works and goes out all the time. He's never home." When leaving, Hainer asked her whether she had recorded him or not. She said no, and explained that trying to track him down would be impossible and that she "didn't want no demerits" if she could not find him. Rather than reward the interviewer for discovering or recording new people and housing units, the procedures tended to conspire against the interviewer and in fact discouraged complete coverage.

Another example reveals how complex this can become when the situation in the field presents operational difficulties for an interviewer. At a unit that had been interviewed several times before, Hainer and a CPS interviewer were greeted in mid-afternoon at the door by a young man holding a 3 year girl on his hip. This "address" was supposed to house a woman and her 3 year old daughter. The interviewer asked for the woman and was told that her work schedule had changed and that she would be home around 7 p.m. instead of the usual 2 p.m., the time the previous interviews had routinely taken place. The man clearly

knew the woman's schedule and knew who the census interviewer was, and that she was expected, though they had never met. He explained with care when the census interviewer should come back to interview the woman listed on the CPS form. After he finished, the little girl grabbed his face and turning it toward her said, "Daddy, is mommy coming home late tonight?" He told her yes.

Hainer later told the interviewer he thought that man should be counted in that household. The interviewer answered, "I'm sure you're right." "Why wouldn't you count him?" Hainer asked "Because the woman don't count him," replied the interviewer. Based on her experience, she worried that if she disputed the woman's presentation, she would not get any further responses from that household.

This problem is a serious one. The Bureau cannot afford, however benignly, to create barriers to recording an elusive part of a difficult population. If Hainer's observations with CPS interviewers are any indication, they could probably find a good number of missing men, with some encouragement. More could be done to support interviewers in reporting these people, by dealing with data quality control issues differently.

Hainer's observations also indicate how difficult the data quality issues really are. At a new sample address they encountered a 17 year old Hispanic girl with an 18 month old baby. She told them that her 17 year old husband also lived there. The interviewer asked questions about the husband's job and learned he was a casual construction worker. The woman got very nervous during the interview and asked if her husband could be left out of the responses. She said, "yes, I mean no ... Maybe I shouldn't have included his name 'cause me and the baby are on AFDC."

Both Hainer and the interviewer were convinced that the woman was not reporting him to the welfare department, and that caused her uneasiness when asked employment related and income questions. They both felt lucky to have counted this man. On further investigation, Hainer found that the monthly income figure provided by the wife corresponded exactly to the amount paid to a family of three in subsidized housing. (It is possible to be married and receive AFDC under certain conditions.) Despite the wife's fears, she was apparently violating no welfare or housing regulations, and should have felt no reluctance to report the true household composition.

Our review of some of the problems here suggests that the Census Bureau can improve coverage by more openly recognizing the difficulties faced by interviewers, such as interviewing in buildings where dark hallways are used for injecting illegal drugs. Pay and benefits are low for the difficulty of the work and the skill needed to do it well.

The Bureau should consider ways to encourage and reward efforts to elicit more complete coverage, even if it is problematic for current survey procedures and forms. The problems are complex, and procedures that improve coverage would probably affect data quality in other ways. For example, it is likely interviewers would identify and interview more males at sample addresses if they received more training on finding missing men; or if they were

told their performance would be monitored on the basis of the ratio of men to women in the households they interview. However, this might also cause coverage for women to deteriorate.

6. Effects of Undercoverage

We have discussed two major sets of reasons why people--especially men--are missed in the census and in Census Bureau surveys. One group is vulnerable economically, and the sources of income on which they and their families depend would be jeopardized if information about the men was available to authorities. They and their families mistrust the government and believe that information given to the Census Bureau will be used against them. By choice, they are not reported to Census Bureau interviewers.

A second group is missed because their living arrangements do not conform to the Census Bureau assumption of a place of "usual residence." Many "family" groups are loosely structured networks spread out over several housing units, with individual members moving among addresses. Many people have tenuous or ambiguous ties to households, are highly transient and do not have a single "usual residence." They may simply never be found by an interviewer, or, if they are found, they may not be reported as living there because their status as a household member is in question. At the extreme, they may literally be homeless.

Undoubtedly, these two groups overlap. Some transients are extremely protective of information about themselves. However, it is important to note that these are distinct causes, and that each introduces a different kind of bias in the data.

The first group, men who are missed by choice, probably have a more devastating effect on the statistics, because they are missed so systematically. House- holds which are motivated not to report men in the census will be similarly motivated not to report them in a survey, so we believe that most of them will not be reported either to the census or a survey. If Black households receiving welfare maintain a consistent story that is presented to all officialdom, then they are unlikely to change that story when a second Census Bureau interviewer comes to call. The consistency with which this group is missed implies that it is very difficult to get any information at all about these people--including administrative record information; they certainly will not be reported to IRS or other agencies if they can avoid it.
Their absence from the data is probably extremely biasing because the reasons they are missed are so directly related to important personal and household characteristics. As we noted above, when "missingness" is correlated with important social characteristics, undercoverage can result in spurious empirical relationships. For instance, Clogg, Massagli, and Eliason (1986) discuss the implausible finding from the CPS that school enrollment rates are higher for Blacks than for Whites, for almost every age-residence category. They speculate that this occurs because of differential undercoverage of Black youth, with those attending school more likely to be counted than those who have dropped out. A second example of a possible artifact is Block's (1979) finding of positive correlations between the proportion of female headed households in an area and police-reported rates of homicide, robbery, and aggravated assault. Such statistics are sometimes used to support the inference

that family disruption causes crime. However, the relationship between crime and female-headedness may be spurious. Crimes tend to be committed close to home, meaning that areas where more crimes are committed are areas with more criminals living in them. Men who are involved in illegal or criminal activities tend not to be reported to Census Bureau interviewers (see Valentine and Valentine, 1971). Therefore, men are probably underreported at higher rates in high crime areas, resulting in inflated estimates of the proportion of female headed households. The correlation between female- headedness and crime rate may be an artifact of differential coverage.

Hypotheses presented in section 3 clearly imply a causal link between sources of household income and being missed: dependence on an income source which limits or prohibits the presence of male earners in the household directly results in underreporting of men. The hypotheses presented here also imply that, in households depending on welfare, other sources of income will be under- or unreported in surveys and the census. (Although they did not collect income data, the Valentines expressed "little doubt that income in general is even more seriously misrecorded than household membership" [1971: 17].)

As noted, we know very little about men who are consistently missed in the census and Census Bureau surveys, except what has been learned in ethnographic studies such as the Valentines'. However, there is some evidence that "missingness" shows a different pattern of correlations with labor force status for Blacks and Whites. The 1970 Census-CPS Match Study showed that, in the population as a whole, unemployed people were more likely than employed people to be missed in the census, but for Blacks "the omission rate for the employed (6.0 percent) appears to be substantially higher than for the unemployed (3.7 percent)" (U.S. Census Bureau, 1975: 9). This finding is consistent with our hypothesis that Black male earners are not reported to the census if information about their presence could jeopardize other sources of household income, including welfare. If it were true that Black men are less likely to be reported when they are employed and bringing in income than when they are not working, this implies a correlation between employment status and undercoverage.

However, results of match studies between the census and surveys must be treated circumspectly, because the hypotheses presented in this paper also imply high correlation bias: men who are motivated to be missed in one will be similarly motivated in the other.

Differences between census undercount estimates based on demographic analysis and on post-enumeration surveys give us a rough idea about the numbers of Black men who are consistently missed in both the census and the CPS or a post- enumeration survey. The hump in Figure 3a shows that in 1980 very large numbers of adult Black men were not found in either the PES or the census, although there is record of their existence (from e.g., birth certificates or previous censuses). Figures 3b and 3c show that roughly the same pattern existed in 1960 and 1970, as well. Thus, for as far back as we know, there is evidence that a very large group of Black men of earning age are consistently missed; we believe this is in part because many do not want to be found.

People who are missed because they are transient, or appear to be, due to the focus on permanent address, also introduce bias. This is because a transient lifestyle is associated with important social characteristics. For instance, there is evidence of an association between a transient lifestyle and victimization by crime. Households and individuals who are mobile report much higher victimization rates in the National Crime Survey (Murphy, 1975). As we have seen, transiency also contributes to being missed in surveys. Cook (1985) presents evidence suggesting that the National Crime Survey may underestimate the number of gun assaults by as much as one-third. He offers the explanation that the National Crime Survey does not adequately cover "the kinds of people criminologists believe are most likely to be victims of serious violent crime--youthful males who are heavily involved in the life of the streets (including participation in criminal activity...)" (Cook, 1985: 100; see also Martin, 1981). As noted earlier, the combined census and CPS undercoverage of Black males 20-24 is at least 34 percent; this figure is even higher for the National Crime Survey.

Finally, it should be clear that the result of undercoverage bias is severely distorted information about the causes of poverty and the characteristics of the so-called "underclass." It is precisely this group which is missed systematically in the census and Government-sponsored surveys, and probably most other surveys as well.

7. Research to Understand and Improve Coverage Error

Our analysis of the causes of undercount implies that people who are consistently missed have different characteristics from those who are counted in CPS but missed in the census (or vice-versa). Different research strategies are needed to investigate these different components of the undercovered population.

We describe a four part research program. The first part is an expanded program of participant observation to understand more about causes and char- acteristics of people who are missed, especially people who are consistently missed in Government surveys and the census. The second component uses existing CPS and census data to study coverage and document the characteristics of those who are missed some, but not all of the time. Comparison of data from these two different sources--systematic observation and CPS-census compari- sons--should allow us to test our hypothesis that the characteristics of people who are consistently missed are different from the characteristics of people who are inconsistently missed. The third component consists of debriefing studies and ethnographic research to learn more about household structure and membership.

The fourth component is devoted to new methods to improve interviewer performance, and convince respondents that data are confidential. We discuss improving the information given to respondents and expanding interviewer training. We also propose four experiments: 1) interviewers participating in an outreach program, 2) conducting interviews anonymously, 3) using only local interviewers in inner-city areas, and 4) conducting interviews under the auspices of an organization which enjoys the trust of the community.[4]

a. Participant Observation Research

Ever since the first ethnographic field study was conducted for the Bureau by the Valentines in 1971, participant-observer studies have been a unique source of information about the undercoverage problem. Participant observation is one of very few ways to learn anything at all about people who, for whatever reason, choose not to be known to the Government.

The Bureau has continued to sponsor participant observation to learn about undercoverage, and in recent years the commitment to this method has expanded. In the 1986 Los Angeles test census, the Bureau contracted with participant observers to conduct independent counts in selected blocks, to check on the accuracy of the census and the PES (Hines, 1987a). In 1987, the Director of the Census Bureau established the Undercount Behavioral Research Group in the Center for Survey Methods Research to conduct field studies in selected hard-to-enumerate subpopulations to learn more about causes of census undercount.

Based on what has been learned about coverage from participant observers, we recommend a two phase research plan. The first phase of the research begins with small-scale, exploratory field studies conducted by trained ethnographers or anthropologists working under contract for the Census Bureau. Using anthropologists who are already in the field conducting independent research both minimizes costs and gives the researchers added legitimacy in the field. These exploratory studies are of three general sorts:

1) Intensive, qualitative interviewing to explore specific behavioral and motivational causes of undercount (such as residential transiency, mistrust of Government and fears about data confidentiality). Interviews are conducted by fieldworkers who have contacts and a history of working successfully among target groups in a local area. These studies yield hypotheses and information about patterns of motivation and behavior which affect census coverage. Hainer's interviews with his informants, reported in section 3b, are an example of this type of research.

2) Observing census operations. Researchers gather information as participant observers in the census or survey process. Hainer's observations of CPS interviewing, reported in section 5, are an example of this type of research. Other studies of this sort are designed to be less obtrusive. The goal of this research is to learn about how the survey or census process actually operates, and to find out if procedures have undesirable and unintended consequences. (For example, procedures may not fit reality, or they may create disincentives, as Hainer discovered.)

3) Conducting independent enumerations of small areas as a check on the accuracy of census or survey results. Hines (1987a) describes this type of research as it was used in the 1986 test census. These independent counts can involve some variation in procedure (such as not asking names). In that case, the study serves as an informal methodological test to find out if a different method might yield more complete counts, and to learn more about the numbers and types of people missed with conventional procedures.

In phase 2, the results of the phase 1 exploratory research would be applied to develop new coverage-improvement procedures which could be implemented by the Census Bureau.

These innovations could be tested in carefully designed field studies conducted by the Census Bureau.

For the 1990 census, for example, participant observer counts of 50 small areas have been recommended to take place immediately after the 1990 census, to provide an independent check of the census and the PES. The same sort of study should be conducted for some surveys as well. Current survey interviews would be conducted in a sample of the households counted by several different participant observers, to compare interviewers' and observers' counts and identify survey misses. Participant observers would be selected to represent a variety of coverage problems and ethnic groups. As a final step, the partici- pant observers, field staff, and others would meet to discuss results and recommend ways to improve coverage.

b. Comparing CPS and Census Data to Understand Coverage

Existing CPS and census data should be thoroughly analyzed to document the kinds of persons missed in the CPS or the census, but not both.

The Bureau conducted a study of 1980 census coverage error by matching against April 1980 CPS households. Persons missed in the census were identified and studied, but only recently has analysis been done in the opposite direction, to look at persons in matched households found in the census but missed in the CPS. Preliminary results were described in section 2(c). Continued detailed analysis will look at the number and characteristics of those missed, charac- teristics of the households with missed persons, and geographic distribution of missed persons. These data can be used to test the hypothesis that many adult Black males who are missed are actually household heads.

It is often assumed that the difference in coverage rates between surveys and the census occurs because surveys miss the same kind of people as the census, but more of them. However, part of the difference may be due to erroneous enumerations (i.e., census imputations, duplications, and fictitious enumera- tions). A second study would subtract PES estimates of erroneous enumerations from the census figures, and then analyze survey undercoverage compared to adjusted census figures. Analyses would be made of omissions by age, sex, race, geographic area, and household enumeration status. One important goal of this study would be to see the effect of these adjustments on the data used in the other proposed coverage studies.

Much of the qualitative research on coverage has suggested that adult Black males are poorly covered, which should have an effect on statistics related to household composition. Yet one study that compared 1970 census and CPS data on household composition failed to show the expected difference (Shapiro, 1979). The 1979 study used weighted CPS data, adjusted within age, sex, and race cells for coverage, which may have significant but unpredictable effects on estimates at the household level. The third proposed study would begin with a special tabulation of the March 1980 CPS supplement with base weights, only. A detailed comparison of CPS and census household data would be made focussing on types

of household, characteristics of persons in households, and geographic area.

CPS coverage data have only been analyzed at the national level. We suggest a fourth study, a detailed analysis of CPS coverage ratio data by geography. This would include calculating and analyzing coverage ratios by state, central city, suburban and rural areas. Coverage ratios would be calculated by age, race, and sex.

c. Research on Household Structure

As we have shown, there appear to be many people for whom the usual residence concept is ambiguous, and these people seem to be more likely to be missed in surveys. Residential attachment and household membership are complex phenomena involving multiple criteria, including role performance and kinship. It should be clear from the discussion above that residency status is not a simple dichotomy (lives here/does not live here) but is affected by such factors as degree of attachment, time frame, or multiple residence. Moreover, for some purposes a person might be considered a household member, and for others not (see Montie and Shapiro, 1978, on this point).

Research is required to learn more about how people think about their living arrangements, to probe the natural categories and criteria for household membership, and to learn more about cultural variations in household structure. Debriefing studies, protocol analyses, and ethnographic research could be conducted to determine how respondents understand survey questions about "who lives here?", and to learn more about their criteria for reporting some people and not others as household members. New procedures are needed to capture information about marginal and multiple attachments to households.

Shapiro (1986) reports some recent efforts to improve coverage in CPS by pretesting probing questions to elicit people who may not be considered full-fledged household members (e.g., "Have I missed anyone who spends 4 or more nights a week here?"), by using more conversational language, and by expanding the household concept. As an example of the latter, the "usual residence" criterion might be expanded to try to cover people who eat in the household, who slept there the previous night or within the prior week, who keep belongings there, or who use the household as a mailing address. Direct questions could also be tested to elicit unreported husbands, partners, or other relatives. In large households, children may be easily missed, and more careful review of the household roster with the respondent might prevent these errors. Shapiro (1986) described a household in which only a woman and her children and grandchildren were reported. At the end of the interview, the interviewer asked directly where the oldest woman's husband was. The respond- ent reported that he lived there, but was left out because his name was not on the lease. Thus, there is some indication that direct questions about unreported family members could improve coverage.

More inclusive criteria for household membership will increase the likelihood of double-counting people, and procedures to deal with this problem will also need to be evaluated (e.g., weighting methods for persons who are members of multiple households). These approaches would also, of course, be inconsistent with the household concept desired

for important data uses, so it will be necessary to collect auxiliary residency information so that persons can be classified by the traditional residency criteria.

d. Innovations to Improve Interviewer Performance and Respondent Perceptions of Confidentiality

The three components of research described above are intended primarily to improve our understanding of coverage problems, rather than implement specific coverage improvements. The component discussed here, however, is for testing and developing new methods to improve coverage by convincing respondents that Census Bureau data are truly confidential. They do not address other causes of undercoverage.

The first idea we discuss is to improve the information given to respondents. We next discuss more extensive training of interviewers. In the rest of this section, we propose experimenting with four new methods and activities. The first of these is for interviewers to conduct a public relations outreach program. The second is to conduct interviews without asking for respondents' names. Finally, we suggest two changes in the interviewers themselves--hiring interviewers who would work exclusively in their immediate neighborhoods, and interviewing under the auspices of an organization that respondents might trust more than the Census Bureau. We do not present a specific plan of experimentation. We might run four different experiments, each testing one of these new methods, or we might combine two or three of them into a single experiment. We could not practically implement some of these methods on a regular basis for Census Bureau surveys. However, even a one-time evaluation survey could provide us with valuable data on the population that we miss.

i. Information given to respondents

New households in most Census Bureau surveys receive only a brief advance letter to inform them that an interviewer will contact them. SIPP sample households, however, receive more information and attention. They are given a colorful folder enclosing reprints of popular articles about SIPP data, a brochure and a reference calendar. The brochures especially are designed to improve cooperation and avoid nonresponse, with a very brief discussion of confidentiality. We suggest that more information be provided to respondents in other surveys, with particular emphasis on data confidentiality.

ii. Interviewer training

It is clear that more careful research attention should be given to the inter- viewers. We need to know more about how they actually implement standard procedures, and how performance standards influence their behavior. If, as we have suggested, many of the Bureau's interviewers are not convinced that data are confidential, then some improvements in training are clearly called for.

Some materials already exist which might be used in interviewer training to convince

interviewers of the confidentiality of Bureau data and the importance of complete coverage. Training for survey interviewers could be enriched using videotapes and other motivational materials developed for use in the 1990 census.

In addition, the Decennial Census Education Project has developed training materials on the importance of statistical data for use at all educational levels. It might also be possible (although far more expensive) to offer inner-city interviewers access to reimbursement for classes (or direct training) in subjects related to coverage, such as statistics, psychology, or anthropology. It is probably desirable to teach interviewers more about the results of research on causes of undercoverage. Interviewers can both inform, and be informed by, coverage research. (The work of a Census Bureau coverage committee, which conducted some of the research described in section 7c, benefitted from the active participation of a senior interviewer.) If inter- viewers understand more about the characteristics of people who are missed, and the reasons why they are missed, they may get better coverage even if proce- dures are not changed. Research shows that when interviewers understand the goal or objective of a survey procedure, they get better data. This suggests more extensive training on residency rules and procedures for listing the household roster, including the reasons for them, and the problem areas in terms of coverage.

iii. Outreach program

One innovation to test is involving interviewers in public relations. Inter- viewers would make brief presentations on Bureau data and services to community groups in neighborhoods where the Census Bureau is conducting surveys. Goals would include generating an atmosphere conducive to cooperation in surveys.

The decennial census outreach is considered important to the completeness of the count, but there is no comparable effort in conjunction with current surveys. Hainer's observations persuaded him that an outreach program is needed. Hainer suggested a publicity campaign to convince people that complete coverage is of value to them, and that the data are truly confidential.

If interviewers are involved in an experimental outreach campaign, it might affect their attitudes toward coverage as well as the responsiveness of sample households. In 1980 an experiment was conducted in conjunction with the Census which tested many of the treatments proposed here. Temporary enumerators received "enriched" training, and were paid for public information duties. The study did not attempt to measure impact on census data, but a significant effect on enumerator turnover was measured (Baca, 1983).

The BLS/Census Committee on CPS Minority Coverage Improvement proposed a 2 year study in regional offices. In that proposal, 10 to 15 PSU's per region would be selected, where participating interviewers would receive enriched training on Bureau services and products. The analysis would compare experimental PSUs to control PSUs and track results for several years before and after the experimental treatment. This proposal might be modified to include some of the ideas discussed in the next sections.

iv. Anonymous interviewing

As discussed in section 3b, Hainer found that providing names in a survey is considered "too personal" by some respondents. In surveys like SIPP, names are virtually required in order to follow movers in subsequent interviews. But in most surveys names are used mainly to simplify the interviewing process. First names or initials would be sufficient for this purpose. It should also be sufficient to obtain household relationships and refer to people as "your 13 year old son" or "the 34 year old boarder."

We propose to conduct an experiment testing anonymous responses. We might conduct full interviews with first names only, full interviews with household relationships, or/and abbreviated interviews with counts only by age-sex-race groups. A control group using normal procedures would be used to compare coverage results.

v. Local interviewers

Another idea for improving survey coverage is to use local, indigenous interviewers. Census Bureau interviewers in inner-city areas usually live in the city, but typically one interviewer covers the entire city for a particular survey. Thus for most, if not all, of an assignment, the interviewer is com- pletely unfamiliar to respondents at the first contact. We propose to experi- ment with hiring people to interview only their block, housing project, or immediate neighborhood. As part of this experiment, interviewers would also get more training about data confidentiality and the importance of complete coverage. Interviewers who are convinced of data confidentiality and who are recognized as neighbors by respondents may be able to elicit actual "unofficial" household rosters.

vi. Interviewing by a trusted organization

As discussed in section 3b, many respondents do not distinguish among Govern- mental units and believe that information given to any Government agency is available to all. We propose an experiment in which interviewers would represent an organization enjoying more trust by minority groups (examples might include the Urban League, the NAACP, or a local city activist group). Although the Bureau would need some control over procedures and training, interviewers would conduct a survey as legitimate representatives of the organization. A control group would be maintained using Census Bureau interviewers.

8. Conclusion

In this paper, we have documented that Census Bureau surveys are subject to substantial undercoverage, especially for Black males and for Hispanics. We do not intend to portray this as purely a Bureau problem as we believe most house- hold surveys probably have even worse coverage. We have also discussed in section 6 the potentially large biasing effect of undercoverage, drawing on the sparse data that exists on bias. We have confined our discussion to within housing unit misses, although whole housing unit misses are also a serious problem. We have discussed evidence for two causes of undercoverage: deliberate

omissions, and lack of fit between Census Bureau "usual residence" rules and people's actual living arrangements. The research and evidence on these causes is substantial and persuasive, but it is not quantitative. We cannot say with any certainty how much these causes contribute to undercover- age.

In the last section of this paper, we proposed an ambitious research program including participant observation studies, special analyses of existing data, research on how people think about their living arrangements, an interviewer outreach program, anonymous interviewing, use of local interviewers, and interviewing under the auspices of a civil rights group. We hope that the Census Bureau will be able to undertake much of this research in the next several years, and that changes can be made that will improve survey coverage.

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NOTES

[1]If noninterview units tend to be large or to disproportionately include Black males, then they would lower coverage rates. Available evidence indicates that noninterview units tend to be small and more or less proportionately divided between White and Black. An indirect effect of noninterviews on coverage is that interviewers sometimes may prefer to miss people entirely rather than record them as noninterviews, for reasons discussed in section 5.

[2]Several different methods have been used to evaluate the completeness of census population coverage. First, a sample of households may be reinterviewed and their records matched with census records to determine the extent of undercoverage. Second, lists of persons obtained from noncensus sources may be compared with census records for the same persons. Third, coverage may be evaluated by comparing actual census counts with expected counts based on demographic analysis of data from other censuses, and data on births, deaths, and migration. Fourth, aggregated data from administrative records (e.g., birth records, medicare enrollments) may be compared with census counts to determine census coverage. All of these evaluation methods are based on assumptions that may be erroneous, and are further subject to errors due to inadequacies in the data available for evaluation, correlated errors in different sources of data, problems of matching records, and the like. For this reason different coverage evaluation methods generally yield different estimates of coverage, particularly for some age-race-sex categories. The reliability of estimates of net census errors varies among different age-race-sex categories due to differences in the quality of data available for evaluation. In general, the less reliable the basic census data, the less reliable the estimate of error in the data; for example, estimates of net census errors are less reliable for Blacks than for Whites.

[3]Proper names used to identify informants are pseudonyms

Figure 1. CPS COVERAGE RATIOS – 70 CONTROLS

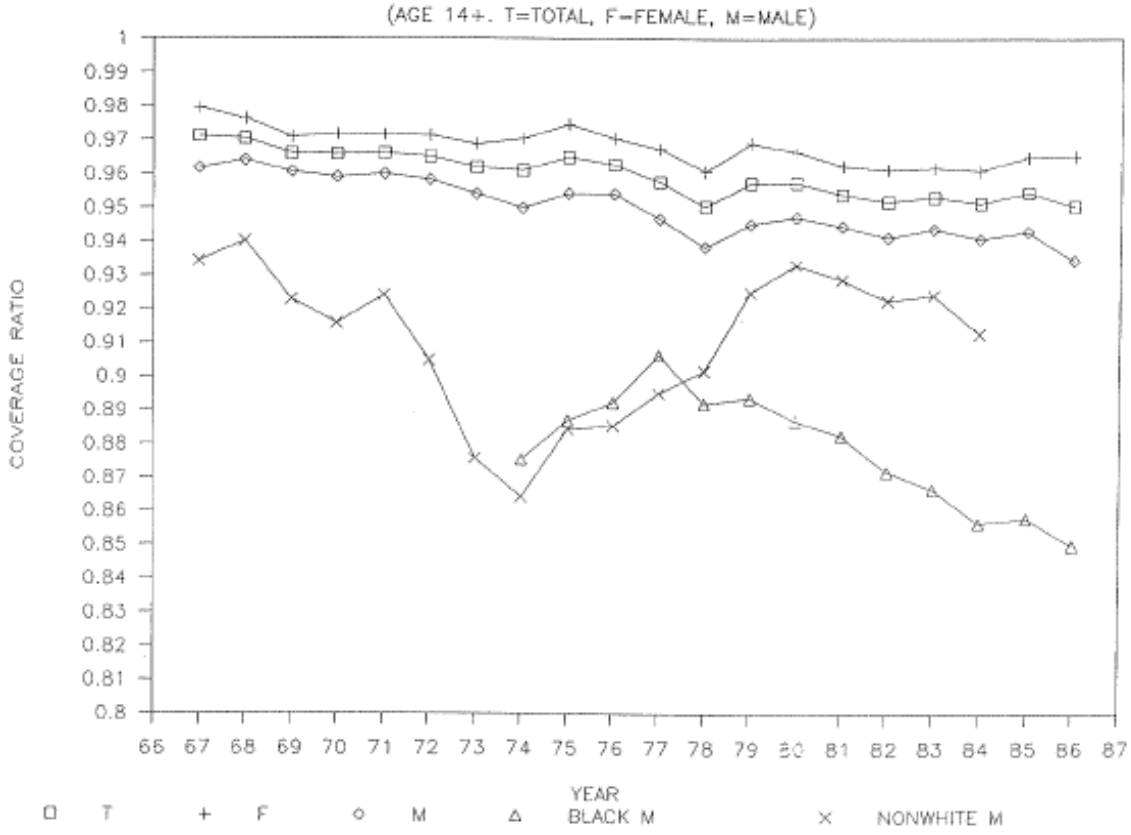
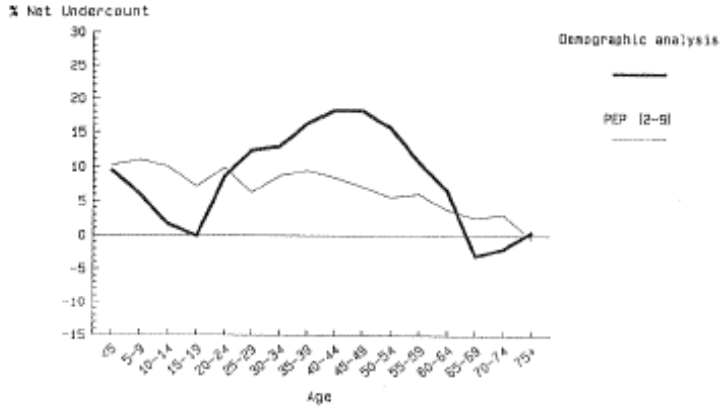


Figure 2. Trends in Estimated Census Coverage of Race-Sex Groups

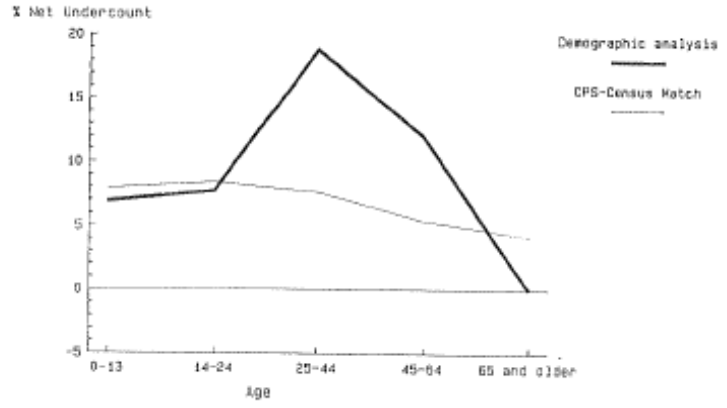
Source: Appendix A, Fay, Passel, and Robinson, 1988.

Figure 3a. Two Estimates of Undercount
Black Males, 1980



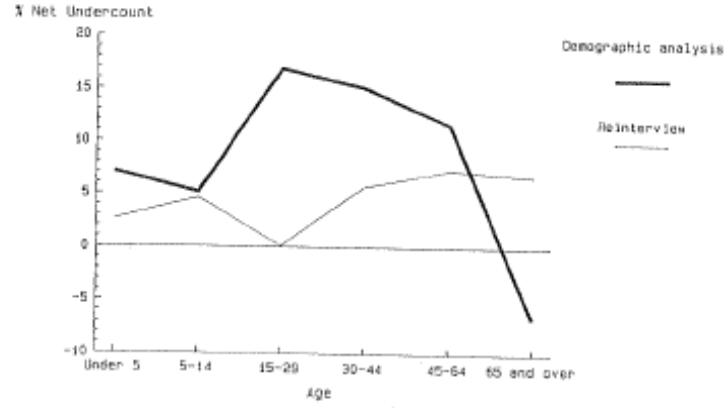
Source: Appendices A and O, Fay, Passel, and Robinson, 1988.

Figure 3b. Two Estimates of Undercount
Black Males, 1970



Sources: Appendix A, Fay, Passel, and Robinson, 1988; Jones and Bloss, 1975.

Figure 3c. Two Estimates of Undercount
Black Males, 1960



Sources: Appendix A, Fay, Passel, and Robinson, 1988; Marks and Waksberg, 1966

TABLE 4: POPULATIONS BY INTERACTION BETWEEN HOUSEHOLD CHARACTERISTICS AND CENSUS OPERATIONS

	Characteristics of Population Subgroups		
Assumptions of Census Operations	Middle Class Model	Black Men	Undocumented Hispanics
Clear, Unambiguous Ties to an Address Known to the USPS (or to local agencies)	• Address known to post office • One family per address • Members have no other address (exceptions are rare)	• Individuals with multiple residence (or with none) • Presence of men is believed to threaten eligibility for welfare	• Undocumented persons who h'de • Illegal (hidden units)
Replicability of Responses	• Adults are knowledgeable about one another • Adults are willing to answer for one another • Persons use one, legal name	• Families don't agree who is a member • Families are not knowledge-able about one anothers' income, employment, relatives	• Language barriers • Extended families with temporary/peripheral members • Illegals using several names
Repeatability (up to several years)	• Groups stay at address for a year to a couple of years • Family composition is relatively stable	• Family composition is fluid • High rate of whole-household mobility	• High mobility of undocumented person • Illegal units may be temporary • High mobility of some periph-eral members of extended families • Assumed names (illegals)
Impact on Statistical Inference	• Relationship, race, depend-ency can be imputed from known age and sex, and from proxy answers • All income is shared with all members	• Income sources are irregular, and income distribution is to "relatives," independent of residence. Inferences about household income are affected	• There are many sources for error if names are aliases, household roster is incomplete or out of date, and language comprehension is a problem

Source: Hines, 1987b.