

Accurate Address Listings to Improve Housing and Population Counts:

A Comparison of Address Listings and Enumerations of Four Sample Areas
by the 1990 Decennial Census, the Post-Enumeration Survey (PES) and the
Alternative Enumeration (AE)

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Abstract/ Introduction:

This report compares the addresses listed, housing identified and the persons enumerated in sample areas for which we have three sources: the 1990 Decennial Census, the Post Enumeration Survey (PES) and an Alternative Enumeration (AE). The Census source was keyed from the census forms geographically attributed to each sample area. The PES source was data processed from a survey conducted by the Census Bureau after and independent from the census. Alternative Enumerations were conducted by ethnographers associated with private, non-profit organizations in part supported by Joint Statistical Agreements with the Census Bureau. (See Brownrigg and de la Puente 1992a.)

We will present findings from a sample area on one side of a city block in the Harlem neighborhood of New York City where the Alternative Enumeration and the resolution of the triple match were personally conducted by one of the authors, A. Hamid (see Hamid 1992, 1993). Dr. Hamid provides detailed explanations for each specific housing unit or person missed or erroneously enumerated to account for discrepancies among the three enumerations. Next, we report briefly on findings from three other sites where enumerations by the Census, PES and an AE overlapped. Finally, a number of generalizations are offered to explain the discrepancies found between the three enumerations. Recommendations for improving the census are offered.

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Harlem, New York City

The ethnographic evaluation which documented the most extreme spike net undercount (53%) on the census researched one side of a block in the Harlem neighborhood of New York City.

Details of the Enumerations in Each Building

I characterize the households in the sample area as non-problematic and problematic. Most of the 24 buildings in the sample area were Brownstones, a type of row house that characterizes much of the Harlem neighborhood. The exceptions were two housing units at institutional addresses and one larger,

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vacant apartment building.

Unproblematic Owner-Occupied Brownstones

In 8 of the brownstone buildings, long term residents of the neighborhood occupied at least one or two floors or else the entire brownstone. For these privately owned brownstones and stable residents, it is difficult to understand why there was not common accord among the enumerations of the AE, the PES and the 1990 census. The African Americans and Caribbean Africans who owned these 8 brownstones had lived in Harlem since the 1920's, and they continued to enjoy significant linkage with the mainstream world (including a belief that censusing was worthwhile). They were linked through work, as current or retired workers, and through their engagements in multiple formal and informal institutions. They should have mailed in their questionnaires. They welcomed the AE, as well as follow-up visits by the Census Bureau.

Usually, these families avoided breaking down their buildings into more than 3 or 4 housing units (1 per floor), and if they accepted tenants, they endeavored to maintain the feeling of a single-unit family home. Enumerators could have detected this distinction very readily.

Nonetheless, there were several discrepancies between the three enumerations. In general, the census missed several whole households as well as persons within households. While the PES and the AE tended to support each other in the enumeration of persons, the PES consistently overcounted housing units in these large brownstones.

Brownstone # 1

	Housing Units Listed	Persons Enumerated
Census	3	2
PES	8	5
AE	2	5

This brownstone belongs a well educated African American retired from work as a high-ranking state official. She occupies the first two floors of the brownstone with her nephew and lets out the upper two floors to three Ethiopians: two sisters and a brother, who have graduated from college and are

working while applying to graduate school. The retired official had dutifully mailed in her questionnaire and had taken the trouble to obtain a census form for her tenants. The elder Ethiopian sister, however, declared that as a foreigner, especially one from Africa, she had no time for the census, and wagered that the census-takers, or the U.S. government had as little time for her. The tenants did not appear on the census.

There are grounds for the AE perception that this brownstone contains two separate housing units and grounds for the view that this is a single family home. The tenants access their floors from a central staircase; the conversion of the top two floors to rental quarters is informal. The Census listing of 3 and the PES listing of 8 housing units are clearly an overcount. The PES affirmed the AE count of the five persons that lived in this building while the census left off the tenants.

Brownstone #2

	Housing Units	Persons
Census	1	0
PES	8	5
AE	5	5

Brownstone #2 is owned by an elderly Caribbean African who emigrated to the US from the island of Barbados in 1915. She has occupied this building since the 1940's. The cheerful, spry 87-year old is more active than her 70-year-old brother, who shares an apartment with her, but she passes her days as vacantly as he does. Both are unable to attend to matters like returning a mail-in questionnaire. Although ethnographers in the AE could not ascertain who managed their affairs, they are served by such agencies as Meals-On-Wheels and the city's homemaker services (administered by the city's Human Resources Administration). Three tenants live on the upper floors, in three separate apartments. Two of the tenants are old-timers like the owner and her brother, and think of the newest tenant, a 50-year-old African American female, as "young blood." The old-timers are unlikely to have responded to strangers or mailed requests, while the newcomer is recovering from the recent separation from her children, and not disposed to other life interests.

The Census missed all these households, regarding this building as vacant, and while the PES once again agreed with the AE on its occupants but disagreed on the number of housing units.

Brownstone # 3

	Housing Units	Persons
Census	1	2
PES	8	5
AE	4	5

The owner of brownstone #3 is an African American female in her 80's who has lived there for three decades. She remains active in her local church and its many activities. She shares the building with her younger brother and a sister, and they have two tenants who have lived with them for more than 20 years. The building contains three flats and a basement apartment. As one housing unit was vacant, there were only five residents in the spring and summer of 1990. The Census counted only one housing unit and only two people of the five well established, long term residents. While affirming the number and identities of persons found by the AE, the PES again overcounted housing units, by assigning two housing units to each floor.

Brownstone # 4

	Housing Units	Persons
Census	4	9
PES	8	4
AE	1	5

Brownstone #4 is the best kept in the sample area. Its owner, a 70-year-old African American female, had originally bought it and a neighboring vacant brownstone in a package deal. Still working and an active part of neighborhood life, she explained that she would never consent to breaking down her brownstone, with all its original details intact and cherished (staircase, bevels, panelling, doors). Accordingly she has shared it with her daughter and three elderly male tenants for several years. The AE characterized this situation as a single family home, with tenants. (The PES later corrected its original listing of 8 units, deleting 7 listings and enumerating only 1 housing unit.) Having a larger number of units to account for, the census

double counted two tenants and placed visitors in one of the nonexistent units. The AE, PES and Census agreed a core of 4 of the 5 residents.

Brownstone # 5

	Housing Units	Persons
Census	0	0
PES	8	5
AE	1	5

This householder is a close friend to her neighbor and is a hardworking African American nurse who lives with her son, her daughter-in-law and her grandchildren. Although they acknowledge that the son pays rent, they can demonstrate that the living quarters are truly shared, and all residents have equal and common access to every space and facility. The owner was reminded by ethnographers during the AE to mail in the questionnaire which she had already filled out. Still, she was not censused: the census omits this address and its residents. While the PES again supported the AE in respect to the number of residents, it counted 8 housing units in this undivided, single family home.

Brownstone # 6

	Housing Units	Persons
Census	3	1
PES	8	3
AE	1	3

Less splendid than others on the street but more modern, with recently fitted and freshly painted gates and safety guards, this brownstone is co-owned by a high-ranking city government official and his wife, also a professional. When he is home from college on vacation, their 20-year-old son lives with them. The census reported 1 occupied housing unit and 2 vacant units, in which a completely unknown person lived. While the PES affirmed the co-residence of the official, his wife and their son who were enumerated in the AE, once again the PES ascribed 8 housing units, two per floor, to this middle class home whose upwardly mobile owners who do not take in tenants.

Brownstone # 7

	Housing Units	Persons
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Census	1	6
PES	8	6
AE	1	6

Yet another socially active female African American octogenarian owns this distinguished looking brownstone, recently painted. On Sundays, Brownstone # 7 attracts throngs from among the members of a nearby church. Their fine clothes mark out the building anew as a special place. In fact, it is a beehive of activity, spewing forth fried chicken and various pies throughout the week under the tight supervision of the owner, who directs the flow to the different church events she caters or patronizes. The brownstone is a temple of cleanliness, industry and religiosity. The owner shares it with her son, her daughter, her grand-daughter and two elderly women boarders from her church, with whom she has been "buddies" for over 40 years. Both the AE and the census agreed in this case on the number of units (1) and the persons (6), but while the PES affirmed the residents, it again listed too many housing units.

Brownstone # 8

	Housing Units	Census
Census	1	10
PES	3	5
AE	3	7

Drug-related problems may account for the different perceptions the various residents of this building have of their living arrangements. The census questionnaire, perhaps completed by one of the two senior family members, lists it as a single family home, mother and father and eight of their children and grandchildren. Unfortunately, the elderly parents had banished two of the children because of their crack addiction, and a third had left.

The remaining family members do not acknowledge the ideology that this building is a single household: they installed three separate doorbells to apartments to which each has its own locked entrance. The basement is not used. The three enumerations differed with respect to the number of residents; the PES supported the AE view that this house was divided into 3 apartments.

Problematic Buildings and Households

Problem Brownstones

Nine other brownstones presented difficulties to the census and PES enumerations. Five of these buildings had new owners and were in different stages of conversion of the internal housing units. Four other brownstone buildings were cut up into numerous small apartments and were operated as small apartment buildings.

Brownstones Experiencing Conversions

Five brownstone buildings which had been purchased within a few months or years of the 1990 Census were in an incomplete state of flux and so posed problems for listing and enumeration in the Census and the PES. In some of these buildings, the internal living arrangements and use of space differed from the physical layout. In some cases, the respective owner remained undecided whether to convert a single family house into a small apartment building or the owner was interested in reconverting several units back into single family home or otherwise reduce the number of internal units. Some of these owners treated the internal space according to their plan.

Problem Brownstone # 1

	Housing Units	Persons
Census	1	7
PES	8	4
AE	3	6

The co-owners of this brownstone are recent Caribbean African immigrants from the island of Grenada. They were unhappy about renting out floors of their home and made sure to select their tenants carefully. (Recently, in 1991, the last of these tenants moved out, and the family re-occupied the entire brownstone: the children had grown up, the father explained, and so they couldn't do without the space any longer.) Only one housing unit appeared on the census, and this suggested that the form had been completed and mailed in by the mistress of the house, who has a wary manner, prone to concealment, in startling contrast to her husband's. Tenants were reported to the census, however. True to its way of mis-characterizing these brownstones generally,

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the PES counted 8 housing units but missed the tenants, young male and female African Americans in their 20's.

Problem Brownstone # 2

	Housing Units	Persons
Census	1	2
PES	8	2
AE	8	4

The 70-year-old owner of this brownstone bought it a short while prior to the Census. The new owner is a first-generation African American, the son of Caribbean African immigrants to the US, who occupies 4 of the 8 distinct, apartments, renting three others to Caribbean Africans and leaving one empty. Nobody is sure what he will do with the building, not even himself. The Census treated the building as a single family house, which it has not been for years. The PES system of calculating 2 units per floor was accurate in this case, but the PES missed 2 of the three tenants.

Problem Brownstone # 3

	Housing Units	Persons
Census	3	5
PES	1	1
AE	8	3

This brownstone had been bought a short time prior to the Census by a young (under 30) African American female attorney who intends to reconvert it to a single family home. At the time of the Census, she utilized only 2 of the 8 distinct housing units into which it was carved, leaving 6 vacant. The owner and a visiting friend lived in one apartment, while a female tenant occupied another. The Census listed the building with 3 units and sent three forms. The attorney mailed in 2 questionnaires, her tenant mailed in the third form, resulting in a census count of 5 for the 3 African American women. The owner and her tenant are duplicated in the census: the owner's friend (whose usual residence is actually elsewhere) appears once. The PES counted only 1 person in this building.

Problem Brownstone # 4

	Housing Units	Persons
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Census	1	1
PES	8	5
AE	6	6

When the new owner bought this larger brownstone, it was a single family home, but the owner has created 6 housing units which he has let to mostly Caribbean African male immigrants. Both the AE and the PES agreed upon this arrangement and enumerated the owner and tenants, but the PES included 2 nonexistent apartments. The Census counted one person and treated this converted building as a single home listing the only 1 unit at this address.

Problem Brownstone # 5

	Housing Units	Persons
Census	6	4
PES	8	4
AE	3	6

The young Caribbean African male (late 20's) who purchased this larger family brownstone a little while before the census made three large apartments out of it, and is letting them out at handsome rents to young well salaried or professional persons or couples like himself. The PES again misread the ethos of the place, and counted 8 dwelling units.

Brownstones Converted into Small Apartment Buildings

Four other brownstones in the sample area which had been cut into 6, 7, 9 or 10 independent apartments challenged the census and PES to establish the number of units. In 3 of these deteriorated brownstones, the PES listed fewer housing units than the Census. Just as the PES attributed too many housing units to several of the more imposing, better maintained brownstone buildings that were actually single family homes or were converted into only a few units, in the 4 buildings cut up into very small apartments, the PES count of apartments agreed with the AE in 1 building and with the census in none.

The four deteriorated brownstones broken down into smaller units offered tiny spaces for low rents, thereby attracting a tenant roll among people with lower incomes. Such tenants were more difficult to enumerate than the stable, long term tenants who lived elsewhere on the block.

Problem Brownstone #6 (Public Senior Citizens' Apartments)

	Housing Units	Persons
Census	11	7
PES	10	8
AE	9	9

One of the brownstones on the block is maintained by the City's Housing Preservation Department (HPD) as a subsidized residence for single senior citizens. Each housing unit in this institutionally- owned building is a formally converted, separate apartment; each houses a single elderly person. This is the only building for which the census probably has the superior enumeration. It was the only building to which the ethnographers were denied access during the AE (twice by the same drunken octogenarian), which consequently had to be enumerated by proxy rather than by observation. The AE estimate came from consulting the mailboxes and a hasty interview with one elderly female resident who explained which mailbox names corresponded to persons still alive and which did not. If the PES or Census also listed the names under mailboxes, they may have added defunct ones. The three sources not only disagreed on the count of housing units, no person appeared on all three enumerations. Two identities matched between the AE and Census, two others between the AE and PES.

Problem Brownstone #7 (Private Housing for the Formerly Homeless)

	Housing Units	Persons
Census	1	1
PES	10	10
AE	10	18

The pastor of a nearby church had bought this brownstone and converted it into 10 minuscule housing units "as a solution to the homeless problem," and indeed, some of the tenants would have been homeless but for these low rents. The Census, listing only one unit, came up with a population count of only 1 of the 10 people counted in the AE and PES. The PES correctly counted the number of housing units -each door is clearly marked- but it missed many young African American males and females in the mid-20's to early 30's age range. Many of the people missed had involvements with drugs or criminality which had

brought them to the attention of the various state agencies of social control. Elderly male and female African Americans living alone were also missed.

Problem Brownstone #8 (Public Low Rent Apartments)

	Housing Units	Persons
Census	8	7
PES	3	8
AE	7	19

This building is managed to provide low rent housing for tenants with low income often on public assistance by the city's Housing Preservation Department (HPD). Buildings managed by this agency have a high turnover of tenants, due in part to the agency's aggressive policy of identifying and evicting tenants with drug involvements. Other tenants come and go when they can't afford better lodgings, or as they leave the status of tenant altogether for that of homeless. Of 18 residents in this building, 12 were either users or distributors of crack and ranged in age from their mid-20's to late-40's. The PES again missed most of them, and missed two young males in the same age range who were drug-free and worked, but who lived alone.

Problem Brownstone #9 (Public Low Rent Apartments)

	Housing Units	Persons
Census	10	5
PES	8	10
AE	6	13

Yet another building managed by HPD as housing for low income people, this brownstone has a neighborhood reputation for alcohol and drug abuse, crime and homosexual prostitution. Although it caught more of them than the census, the PES missed several young African American males and females living on their own or in unusual "freak house" style of households created among drug abusers.

Vacant Buildings

In addition to the buildings described above, there were 5 vacant buildings in the sample area (4 brownstones and 1 larger apartment building). Empty buildings are readily recognized as such, unless they are occupied by the

solitary, unobtrusive squatter. I learned how many housing units were within each vacant building from home owners in the neighborhood, who are generally interested in neighborhood real estate. Some neighborhood residents may be responsible for advertising their sale or keeping an eye on the vacant buildings. Nevertheless, the PES overcounted housing units, and placed one individual erroneously as living in a vacant house. This person actually lived across the street (outside the sample area) and had been entrusted by the absentee owner with the charge of taking care of the building. He mailed in a questionnaire declaring himself as its sole resident. The same individual had revealed during the AE, when he had supposed that the ethnographers were prospective buyers, that the building contained 8 housing units, and required a "gut rehab."

Another of the empty brownstones was one of a pair bought by an owner who lived in the sample area. She revealed that she had sold it to buyer who intended to leave it in its original condition and make a single family home.

	Housing Units	Persons
Empty #1		
Census	1	1
PES	10	0
AE	8	0
Empty #2		
Census	1	0
PES	8	0
AE	8	0
Empty #3		
Census	1	0
PES	8	0
AE	6	0
Empty #4		
Census	1	0
PES	8	0
AE	1	0
Empty #5 (Apartment Building)		
Census	20	0
PES	0	0
AE	20	0

What is most striking about the differences in listing housing units within these five vacant buildings among the three enumerations is the consistency. When the PES listed the building, it mechanically listed 2 per floor but this was correct for only one building. (The PES originally listed the largest building on the block, but it was not in the sample area through an error attributed to study method). The Census source for the number of units (originating in commercial address lists) concurred with the AE about the number of housing units for only two of the five empty buildings.

Institutional Buildings

Two other buildings in the sample area should have been censused, but were not. Neither the Census nor the PES found the housing unit within the Protestant church; the PES should have determined on sight that such an expensively equipped church in a high-crime area, might have a live-in caretaker. Although he maintains a residence elsewhere, his job requires that the caretaker stay at the Church, so he should have been counted by the Census and the PES at this worksite home.

The PES and Census should have recognized that a rectory for four Roman Catholic priests was a single housing unit. Instead, the PES put three priests in three separate housing units, and missed the fourth priest. Misgeocoding may explain why the census did not receive the form that the Roman Catholic priests told me they had sent in. The priests had distinguished themselves in the neighborhood before Census Day for vigorously promoting the event.

Church

	Housing Units	Persons
Census	0	0
PES	0	0
AE	1	1

Rectory

	Housing Units	Persons
Census	0	0
PES	3	3
AE	1	4

Some General Remarks about the Harlem site

1. At the Harlem site, the PES made the error of thinking that the more deteriorated brownstones would have fewer housing units and that the more imposing, better maintained brownstones would have more. This assumption ignored the political aspect: the deteriorated brownstones were cheaper to buy, more likely to attract lower-income tenants and were more easily expendable, while the larger brownstones housed antiquity in the neighborhood

and the grand ambitions of their inhabitants. Accordingly, the deteriorated buildings invited limitless subdivision -for example, they sheltered homeless persons in stairwells in addition to residents- while private owners of the more imposing ones resisted and begrudged any tenants at all. A stroll in the neighborhood should have established this logic.

2. The principal identity of persons missed by the PES is single, young (but sometimes elderly) male and female African Americans, many of them living alone and apparently cut off from significant neighborhood ties other than those of the drug culture.

3. Missed people in missed housing units explains the bulk of the dramatic census net undercount in this sample area. Adult, African American men living alone in a separate apartment were the dominant type of household on this block, therefore, miscalculating varied number of internal units in the outwardly similar brownstone buildings was the single most important immediate cause of the severe net undercount on the census in this block.

4. The Census and the PES both included a number of erroneous enumerations, primarily of African American women, and omitted people within households. The PES overstated the number of housing units, however the PES count was close to and confirmed the presence of specific individuals found in the AE.

5. Although this block contained stable, owner-occupants most found in all three enumerations, there were few families with children on this block and the majority of the residents were low income renters. Some of the stable residents were duplicated; the more economically marginal were missed.

(For more information on the AE to Census match see Hamid 1992.)

People missed because the housing unit where they lived was missed by the census or because their home was erroneously censused as vacant was the leading immediate cause of census undercount documented by the match of the Alternative Enumerations to the data keyed from Census forms. In the ethnographic sample areas selected to represent "hard-to-enumerate" low income neighborhoods where 30-95% of the residents belonged to minority race/ethnic groups, more people were missed due to the omission of whole households in the

census in every race/ethnic group than the population omitted within households which were partially censused. The rate of whole household omissions was high for Whites who lived in these neighborhoods, as well as for minorities. (See attached Chart I.)

The ethnographic evaluation was fortunate that the extreme undercount found at the Harlem sample area was confirmed independently by the Post Enumeration Survey. This "cluster" -- as the Post Enumeration Survey names their sample area -- had one of the highest rates of non-match to the census of any of the PES' 1600 clusters nationwide. The Post Enumeration considers if a person enumerated in their survey has no "match" to a census enumeration record and was a resident Census Day then the person was omitted. Omissions are one basis for calculating net undercount.

In three other ethnographic sample areas at least one block overlapped in the with a PES cluster. These sites were located in rural North Carolina, Ft. Lauderdale, Florida and Guadalupe, California. At two of these sites, North Carolina and Ft. Lauderdale, the PES enumeration also scored among the highest non-match rates of all PES clusters in the country. The ethnographic sample was deliberately set in areas where characteristics predicted that undercounts would occur. These sites with very high non-matches, comparing the census to the PES, were located in a rural, minority community of state recognized Indians in North Carolina and in a low density neighborhood of Ft. Lauderdale, Florida inhabited by African Americans born in the U.S. and immigrants from Haiti and other Caribbean Islands.

In the rural North Carolina site and the Ft. Lauderdale site, as at the Harlem site, the AE and PES both documented that the primary, immediate cause of the census undercount can be attributed to the Census missing occupied housing units.

Rural North Carolina

A PES cluster covered one block of the larger rural North Carolina ethnographic site where comparisons were made between an AE and the Census (Lerch 1992c). In the overlap block, the census, PES and AE matched in referring to 54 occupied and 3 vacant housing units. However, an additional 13 occupied housing units and 6 vacant units within the block were found by the AE and the PES and matched but these housing units and the people who lived in them did not appear in the census enumeration. One additional housing unit (a trailer) appeared on the Census and the AE, but not on the PES. The original AE erroneously included one house actually located just outside the block. The PES address listed five vacant housing units which did not correspond to any on the census or AE. When the ethnographer checked out these PES listing locations on the ground, she determined none were valid housing units: abandoned dwellings, boarded up houses, a parked camper and an abandoned store.

The ethnographer who researched the North Carolina site found that the housing units (and thus the households and people) omitted from the census were located on unnamed, interior roads and the residents of the occupied dwellings omitted by the census received mail at "family" boxes located on perimeter roads. The number of mail boxes did not correspond to the number of separate houses each served.

The North Carolina example is important because the census enumerators, the Alternative Enumeration team and the Post Enumeration Survey interviewers independently compiled address lists following essentially the same procedures (see US Bureau of the Census' Crew Leader's Manual (for) List/Enumerate 1989:2-3; Post Enumeration Survey Lister's Manual; Brownrigg I.8. -I.16 and appendices). The ethnographer attributes to three, relatively minor differences in the listing procedures, the difference in outcome:

the census address listing emphasized collecting mailing addresses rather than physical location and descriptive information on physical location was sketchy or blank, yet in this rural area, roadside boxes were shared by several different households and were not strictly related to particular housing units;

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the census address listing did not create or refer to a sketch map showing physical location; and

the census did not employ as knowledgeable local personnel as did the PES and AE.

The AE and the PES both created accurate sketch maps and cross referenced the housing units listed to numbered spots on their respective maps showing house locations. Both the AE and the PES address listing involved locally hired people from the community who had "insider" knowledge. The ethnographer (Lerch July 1992) points to the strengths of the AE and PES address listing:

incorporation of "insider" knowledge by hiring and training people familiar with the area;

clear guidelines and procedures describing the mapping and address listing procedures;

continuity of personnel from the mapping and address listing stage into the (enumeration) interview stage;

clear follow up procedures to check error or look for omission of records.

Paramount to reducing errors in future censuses, Lerch suggests

"First, improving the accuracy of the address list for rural minority areas is imperative. This could be done by selecting key people, who are familiar with the living arrangements and patterns of mail delivery and address assignment in the area to prepare lists. These key people may be mail carriers or members of (local) organizations."

(Lerch 1992b)

Ft. Lauderdale

According to the ethnographer, the Ft. Lauderdale overlap block contained 33 housing units as of Census Day 1990, 32 of which she listed in the original AE and 1 "shed that is rented out from time to time as living quarters" that she

found in follow up fieldwork. Census addresses for 25 housing units are from some dated source because 2 addresses on the Census corresponded to empty lots; the houses that once sat on these lots had been razed years before Census Day. These two non-existent addresses appear in the final census (100% detail file) as vacant housing. Meanwhile, the Census entirely omitted ten houses. The Census relied on out-dated information about addresses in a fast-changing area.

The PES prepare a fresh list at this site giving addresses for 19 housing units in the Ft. Lauderdale block and four additional households enumerated without addresses: a total of 23 housing units. The people in all four of the households enumerated without addresses have matches in the AE and Census but one of the 19 addresses is not correct. The PES yield is fifteen occupied and 8 vacant houses.

Ft. Lauderdale Site

	Census	PES	AE
Total housing units (HU)	25	23	33
Total households (HH)	17	15	24
Total vacancies	8	8	8
Boarded up			1
Missed housing units	10	10	(1)
Missed households	7	5	
Missed vacancies	3	5	
Missed boarded up	1	1	

The 33 housing units as of Census Day 1990... (included) a two story eight unit apartment building,... what look to be eight individual wood ("shot gun") homes, one duplex and a big rambling house obviously subdivided into individual units. Almost every property is surrounded by a fence, chain link the more usual, but two are obscured by 6' wood fences. Their opacity hides the fact that, in one case, what looks like a single home, is instead three units, and in the other, what looks like a single home is in fact a duplex. Behind two individual homes, two different addresses, separated by a narrow path, is a small cottage, completely invisible from the street.

(Wingerd 1992:1)

The ethnographer explained that an observer must go behind the buildings that face the street to count all the housing units in this block, yet all of the addresses on the PES face the exterior boundary streets. Notes made by a Post Enumeration interviewer complained that

"whoever did the listing of the living units evidently never got of his or her car...and just wrote the numbers of the units that they could see from the street. Behind quite a few of the units are shacks and condemned structures."

At the Ft. Lauderdale site, in addition to the physical barriers, language

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barriers to enumeration existed. Many residents spoke Haitian Creole, as did the ethnographer who studied the area; some also spoke French. The language barrier may have prevented the PES from obtaining a thorough listing of the housing because there is no evidence that any PES staff sent to this Ft. Lauderdale cluster spoke Haitian Creole or French. The language barrier further deterred the PES enumeration; PES' misspellings of common Haitian names and omissions of names and personal data made it difficult to infer a match to the correctly spelled Census and AE names. Only 4 households returned census forms by mail from this block, therefore the census here was largely conducted as a face-to-face enumeration. One of the follow up census enumerators was Haitian, fluent in Haitian Creole. Her ability to converse with the Haitians made the Census enumeration superior to the PES and closer to the AE, which was also conducted in Haitian Creole in the households where people were more comfortable in that language. At this site as in the others, missed units accounted for missed people. The Census enumerated 65 people, the PES (after two passes) 54 and the AE, 77.

Lessons the ethnographer drew from her analysis of this triple match

"indicate that, even without the ethnographic curiosity or much time, accuracy in enumeration could be improved if enumerators:

1. suspect address lists created earlier or by others
2. recognize multi-unit potential of single addresses
3. realize that lack of access does not mean vacancy
4. have a household member give information
5. enumerate in the language of the enumerated. "

(Wingerd 1992b)

Guadalupe, California

The fourth area where a PES cluster overlapped with the AE so that a three way comparison was possible between the Census, AE and PES, was essentially well enumerated by all three. The minor discrepancies among the three enumerations center on less than 2% of the population. Different "arrimados" or boarders living with family households of their relatives were found by the three enumerations. It was difficult to establish which, if any, in this more mobile segment of sojourners were in fact Census Day residents. Respondents tended

not to report these boarders to the census or PES.

Addresses in the Guadalupe, California farm worker neighborhood were independently listed by the Census, AE and PES. In this community of single family homes on large lots, the address of each set apart house is clearly derived from the name of a street and house number. It is a new subdivision so conversions have not begun. Agreement among the Census, AE, and PES as to the housing units and the address record data itself smoothed the way for good, close counts.

The influence of regular and irregular housing in census outcomes

Housing at the Guadalupe site can be considered "regular". There are "city style" addresses. Housing is homogeneously the same style and type: single family. At another ethnographic site in a subdivision of single family homes and also in the high rise apartment buildings sites, the housing units were also "regular" and the Census and AE agreed on the number of housing units and addresses. In these sites of "regular" housing, there were no wholesale omissions of occupied households.

By contrast, the group of ethnographic sites which included the Harlem, Ft. Lauderdale and North Carolina sites can be qualified as having "irregular housing". The "irregular" feature of the Harlem site was the heterogeneity of the internal subdivisions of the brownstone buildings with similar exteriors. The irregular features of the rural North Carolina housing included the discontinuity between mail address and location, a lack of city style addresses, some heterogeneity of housing types between mobile homes and frame houses, some of which were vacant or abandoned. The location of the housing on rough, dirt roads off highways could also be considered an irregular feature. The irregular features of the Ft. Lauderdale site included a heterogeneity of housing types such as single family shot guns, shot guns converted into multiple units, small apartment buildings and non-standard buildings such as sheds used as living quarters, as well as the "fortification" of chain-link and board fences that literally hid units.

The Guadalupe site had a number of social characteristics that the ethnographic evaluation has found to correlate significantly with very low

rates of census error, either undercount or overcount. A high proportion of the population at Guadalupe were young children; most of the households contained a core nuclear family of a young married couple and their children. Although in many of the households Spanish was spoken and was preferred, most adults and children were bilingual. Census enumerators for the follow up enumeration conducted many of their interviews in Spanish. The combination of bilingual enumerators and many bilingual respondents effectively overcame any the language barrier.

At Guadalupe, the language barrier was overcome because communications were possible between bilingual respondents and bilingual enumerators. The language barrier inhibited the PES but not the census or AE at the Ft. Lauderdale site because the census and AE enumerators spoke the languages used by the population.

The other three sites overlapped with the PES lacked Guadalupe's constellation of social, demographic and housing characteristics. The North Carolina rural community was tightly woven with kinship connections among the family households. Like the Guadalupe site, the North Carolina community could be characterized as socially highly integrated and proved easy to access by hiring an insider to help with the AE and PES enumerations. Thus, the contrast between the undercount at the North Carolina site and the good censusing at Guadalupe points to the differences in housing and addresses that led to missed people in missed units.

The Ft. Lauderdale and the Harlem site could be qualified as dangerous neighborhoods marked by crime and homelessness: perhaps this aspect intimidated census and PES workers who did not seek guidance through the pitfalls from residents as did the AE. Neither at the Harlem site nor at the Ft. Lauderdale site were there a high proportion of children; fertility ratios were low. Both Ft. Lauderdale and Harlem were sites where Black men outnumbered Black women and Black children. Both registered high undercounts. Our analysis suggests that certain features of neighborhoods need to be taken into account to design specialized approaches for census enumerations. As long as the census is based on an address list of housing, any effort to assure the list of housing to-be-enumerated is more accurate and complete will improve the population count. It is to check and verify all address/housing lists intensively and completely prior to censusing. It is important to

identify housing in the field rather than rely on postal or other registers. For door-to-door enumeration procedures, it is important to have accurate information about the actual location of housing units: mail address is often insufficient for finding housing units. In areas where languages other than English are spoken, the Census Bureau could hire people who speak the appropriate language. Speaking the language of respondents is as important for finding housing units as for finding people. In areas where there are large numbers of children, regular housing with clearly marked "city style addresses", whether single family homes or well organized apartment buildings, assume that censusing will be relatively easy. In areas where the population have low literacy or speak languages other than English, do not expect high response rates to mailed out forms: provide assistance through enumeration help centers or provide face-to-face enumerators who speak the languages. Finally, local people who know the terrain and the community must be enlisted to advise census operations. The local people can be hired to list addresses or enumerate or supervise, or they can be hired as "consultants" to others who fill these roles.

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