

COVERAGE IMPLICATIONS OF USING THE TERM "USUAL RESIDENCE"

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BACKGROUND

The goal of the census is to enumerate each person at one and only one residence. Census' definition of who should be counted at a residence operates on the idea of living or sleeping at one place most of the time. The term "usual residence" has been used on past census questionnaires and is defined as the place you live and sleep most of the time. Because most people have only one usual residence, the Bureau of the Census expects most persons to be correctly enumerated. There are persons however who are not enumerated correctly. Incorrect enumeration which includes missing persons and erroneously including persons at the residence is a problem in both censuses and surveys.

Using data from the Living Situation Survey (LSS) this paper examines three different potential sources of enumeration error: incorrect understanding of the term "usual residence," confusing or burdensome residence rules, and incorrect assessments of living situations of individuals.

METHODOLOGY

Design of the Living Situation Survey

The LSS conducted by the Research Triangle Institute for the Bureau of the Census is a national probability sample of housing units with oversampling of minority and renter areas. The sample was selected using a multistage sample design.

From a personal visit interview, an inclusive list of all persons associated with the sample housing unit (SHU) within the past two to three months was obtained from a household respondent (HHR). The HHR answered a series of thirteen roster questions which did not use the census residence rules. After the rostering process, the HHR was asked questions about each individual. In addition to gathering information about the individual from the HHR, particular individuals were selected to answer questions about themselves.

With a 79 percent response rate, the LSS interview was completed in 999 housing units. In the 999 LSS

housing unit interviews, 3537 persons were identified. Of those persons, 2825 had more than a casual connection to the SHU. Of those 2825 persons, 1451 completed an individual interview. Refer to Lynch et. al., 1993 for description of selection for individual interviews.

Procedures used to analyze Living Situation Survey data

All estimates were weighted to reflect the sample design. The weights are also adjusted for noninterviews. The software package VPLX was used to produce all standard errors (Fay, 1990). The software package CPLX was used for the loglinear analysis (Fay, 1989). The two software packages adjust for the complex sample design of the LSS. They use a jackknife estimation method. An $\alpha=0.10$ was used when testing for significance.

Several demographic variables were used during analysis. The values were obtained from the HHR for each individual. Three categories of race/ethnicity were used: (White and Other)/non-Hispanic, Black/non-Hispanic, and Hispanic. The Hispanic category could include persons of any race. The age of the individual was grouped into four categories: 0-17, 18-29, 30-49, 50+.

Because of the consistent undercoverage of Black and Hispanic men of the ages 18-29, this hard-to-enumerate (HTE) group was sometimes examined separately (Hainer, Hines, Martin, and Shapiro, 1988). In the 2825 cases there were 136 HTE persons. In the 1451 cases there were 76 HTE persons.

Each housing unit was classified into one household type:

- non-extended family (includes single persons, married couples with or without child(ren), single parent with child(ren), and unmarried couples with or without child(ren)),
- extended family (includes three-generation families, two related families living together, siblings only, and grandparents with grandchild(ren)), and
- nonrelative (households with at least one nonrelative, who is not a boyfriend or girlfriend, living there).

Also used was a usual resident size of the household variable: (3 usual residents or fewer, 4 or more usual residents).

A person was classified as having little mobility if they stayed only in one or two places during the reference period; otherwise the person was classified into a high mobility category.

A variable designating whether a person had one, two or no usual residences according to the HHR was used for some of the analysis.

All of the 1451 persons who received an individual questionnaire were identified as having a "typical" or "atypical" living situation. Persons who had little mobility away from the SHU during the reference period, spent the night before the household interview at the SHU, were both a usual resident and member of the household per the HHR, and did not have another usual residence per the HHR were classified as having a "typical" living situation. Others were classified as having an "atypical" living situation.

RESULTS

Relationship between usual residence classification and a time based definition

Both the census and the LSS use the term "usual residence." The first line of the 1990 census questionnaire states, "The 1990 census must count every person at his or her 'usual residence.' This means the place where the person lives and sleeps most of the time." In the LSS the HHR was asked to provide a response to this question, "Do you consider this address to be (your/NAME'S) usual residence, that is the place where (you/NAME) live(s) and sleep(s) most of the time?" for each person identified. In both the census and the LSS "most of the time" is not clarified. Most of the time implies more than half of a time period. This time period could be a week, a year, or since the person moved into the residence.

Data from the survey allow us to determine whether respondents implicitly use a time definition when identifying usual residents. Because we do not have data for a year, and because a week seems too short of a reference period, we used the LSS two to three month reference period for classifying the 2825 persons into a time-oriented usual residence category.

Persons who spent more than 50 percent of their reference period at the SHU were considered usual

residents by this time-oriented definition. Those who spent less time were considered not usual residents. The reference period used for the calculation was adjusted for people who moved into the SHU during the two to three month reference period. Their adjusted period started on the day they moved into the SHU through the interview date. For people who moved out of the SHU during the two to three month reference period, their adjusted period was zero. Thus all out-movers were considered to be not usual residents by this time-oriented definition.

Of the 2825 LSS persons identified who had more than just a casual connection with a housing unit within the reference period, 95.40 percent (2671) were considered to be usual residents by the HHR. Only 92.73 percent (2592) were found to be usual residents using this time definition. This usual residence determination was compared to the usual residence classification by the HHR. If the two agreed there was consistency; if they didn't there was inconsistency.

For 94.89 percent of the individuals there was consistency between a usual residence determination using the time definition and the HHR's usual residence response. The HHR called 3.7 percent of the individuals usual residents and yet they were not at the SHU more than half of their reference period. Likewise, approximately 1.41 percent of all the individuals identified had stayed at the SHU for more than half the reference period and yet were not considered usual residents by the HHR. It is interesting to determine which characteristics, if any, affected the consistency between the HHR's usual residence determination and a time-oriented determination. Two loglinear models were used to do this analysis.

The response variable used in both models was whether there was consistency between the time definition and the HHR's determination. Variables included as main effects in the first model included race/ethnicity, gender, age, household composition and usual resident size. Variables included as main effects in the second model included the HTE status, household composition and usual resident size. Other variables such as mobility were not used because they were correlated with the time-oriented usual residence determination.

The variable age was significant in the first model. There was consistency between the two usual residence determinations for persons 50+ and inconsistency between the two usual residence determinations for persons 18-29. The variable HTE was significant in the second model. There was inconsistency between

the two usual residence determinations for HTE persons compared to the non-HTE persons.

The significance of the HTE variable in the second model prompted us to examine the effect further. From Table 1 we find that although the HHR identifies 91.86 percent (74.19+17.67) of the HTE as usual residents, many of these usual residents would not have been classified as such if the time definition was used.

Table 1: Cross Tabulation of Usual Residence (UR) determination by HHR versus a Time-Oriented UR Determination for HTE persons (N=136, Percents are weighted)

	UR by Time	Not UR by Time
UR by HHR's response	74.19%	17.67%
Not UR by HHR's response	5.61%	2.53%

Relationship between usual residence response and a classification based on census residence rules

In addition to providing the one sentence definition of "usual residence," the 1990 Decennial Census questionnaire also provided two lists of cues in the format of an "Include" and a "Do NOT Include." See Figure 1. These lists provided a condensed, but also limited version of the census residence rules.

Figure 1: Census residence rules on the 1990 census form

- Include**
- Everyone who usually lives here such as family members, housemates and roommates foster children, roomers, boarders, and live-in employees
 - Persons who are temporarily away on a business trip, on vacation, or in a general hospital
 - College students who stay here while attending college
 - Persons in the Armed Forces who live here
 - Newborn babies still in the hospital
 - Children in boarding school below the college level
 - Persons who stay here most of the week while working even if they have a home somewhere else
 - Persons with no other home who are staying here on April 1
- Do NOT include**
- Persons who usually live somewhere else
 - Persons who are away in an institution such as a prison, mental hospital, or a nursing home
 - College students who live somewhere else while attending college
 - Persons in the Armed Forces who live somewhere else
 - Persons who stay somewhere else most of the week while working

The LSS used the one sentence definition of usual residence, but did not communicate any of these rules to the HHR. Comparing the HHR's usual residence response to a usual residence determination using the census residence rules allows us to determine the amount of agreement between the rules and the one-sentence definition. To do this analysis, each of the 1451 LSS persons with individual data was analyzed and coded¹ as to whether they would or would not have

been a census usual resident at that SHU. In addition to determining the "official" census usual residence status of each person, the rule used to make the determination was noted.

The coding was accomplished by applying the census residence rules to each individual based on mostly narrative information (s)he provided. There are currently 17 census residence rules for housing units (U.S. Bureau of the Census, 1989). Not all of the 17 rules are on the "Include" and "Do NOT Include" lists of the 1990 census form.

One would imagine, however, that most people don't need a specific rule other than "they live at that residence and only that residence." For this reason, the 1128 persons with typical living situations were automatically classified as usual residents using the census rules although we did not actually code their narrative information. Characteristics of the remaining 323 persons were examined.

Persons could theoretically fit two or more rules. There are no instructions on the census form for such situations. In this coding process, each person was classified into only one rule/living situation. The following rule assignment sequence was used in the coding.

1. Person in college and living away were coded as not usual residents and persons in college and living at the residence were coded as usual residents of the SHU.
2. Persons identified at a migrant camp or an institution (e.g., jail) on the night before the LSS interview were coded as not usual residents. Persons identified in a general hospital on the night before the interview were coded as usual residents of the SHU.
3. Persons in the military and living on base during the reference period were coded as not usual residents. Persons in the military and living at the SHU were coded as usual residents.
4. Persons who split their time between two places or persons who spent a large amount of time at another place were examined and coded as either working and living at another place (i.e., not usual residents of the SHU) or having two residences (the person was coded as a usual resident at the place they stayed at most of the time).
5. Persons who appeared to float from place to place with no "home" and no reasons that implied visiting or working were considered homeless and were coded as usual residents of the place they stayed at the night before the LSS interview.

6. Persons who didn't sleep at the SHU on the night before the LSS interview and didn't fall into one of the other rules, were considered temporarily away and were coded as usual residents of the SHU.

7. For all others, a rule was not cited and persons were census usual residents of the place where they spent most of the reference period. The "most of the time" rule was applied in the same manner as in the previous analysis.

Once coded, the census usual resident classification was compared with the usual residence response the HHR provided for the 323 persons with atypical living situations.

The first column of Table 2 shows the distribution of the 1451 persons with individual questionnaires into the census residence rules. (There are more census residence rules than listed in Table 2.) Of these persons, 90.63 percent had a "typical" living situation. About half of the remaining people (4.68 percent) had a living situation where there was some mobility during the reference period or interesting attachment to the SHU, yet these persons did not have a living situation that could be defined by an existing residence rule. Another 2.34 percent of persons were away on the reference night, and 1.29 percent of persons had more than one residence. The remaining 1.07 percent of persons had some of the more unusual living situations, some of which were on the list of "Include" and "Do NOT Include" cues for the 1990 census form.

The last row in Table 2 demonstrates how the HHR's response to the usual residence question and the official census usual residence determination based on the residence rules agree for the persons with atypical living situations. The determination using census residence rules agreed with the HHR's usual residence determination for 69.20 percent (44.69 + 24.51) of these persons. The determination using census residence rules disagreed with the HHR's usual residence determination for 30.81 percent (24.58 + 6.23) of the persons with a standard error of 11.54. Assuming no inconsistency for the 90.63 percent in typical living situations, this translates into an overall 2.88 percent rate $(9.37) \times (30.81)$ of inconsistency between a "definition only" usual residence determination verse a determination using the census residence rules. The standard error for this estimate is 1.45.

The last row of Table 2 also provides the percent of possible misses and erroneous enumerations. Of this population which has an "atypical" living situation, 24.58 percent are potential misses (i.e., they should be

counted at the SHU per census, but the HHR does not include them) and 6.23 percent are potential erroneous enumerations (i.e., they should not be counted at the SHU per census, but the HHR does). This translates into a weighted 2.29 percent miss rate and a 0.58 percent erroneous enumeration rate over the entire population, assuming no errors are made for people in typical living situations.

Discrepancies in understanding living situations within the residence²

Usually the household respondent for the census is the person who owns or rents the housing unit or the spouse of that person (Thompson, 1994). Although it is sometimes difficult to obtain accurate detailed information from proxies, it is assumed that persons with such strong relationships to the household would understand the living situations of persons associated with the housing unit, and thus provide a correct household roster. The LSS allows us to analyze whether the HHR's understanding of living situations within the residence is the same as the individual's perception. In addition to quantifying the amount of inconsistency, the LSS also allows us to determine the characteristics of people whose living situations are classified inconsistently.

The LSS allows persons to designate two usual residences. Both the HHR and the individual provide independent classification into one of these five categories.

- a usual resident of the SHU and no other place
- a usual resident of another place only (i.e., not the SHU)
- a usual resident of the SHU and of another place (dual residences)
- not a usual resident of any place
- one or both of the responses is invalid or missing

Of the 1451 persons who completed an individual questionnaire, 999 were HHRs. This analysis did not compare the HHR's response to itself. Of the remaining 452 persons, 151 were children who had a proxy and 139 of the remaining adults had a proxy. The analysis presented here only examined the 162 adults who did not have a proxy. The weights reflect only these people.

In Table 3, responses to the two usual residence questions from the HHR and the individual are compared for these 162 persons. According to the individual's response, we find 96.05 percent

(94.54+1.51) of these individuals have only one usual residence. Approximately 2.61 percent have dual usual residences and 1.26 percent have no usual residence.

This table demonstrates that in 95.40³ percent of the cases, the HHR and the individual agree on the living situation in terms of usual residence. Through two loglinear models, the characteristics of the persons whose living situations agree with the HHR's understanding are compared to the cases where there is some ambiguity. Variables included as main effects in the first model included race/ethnicity, gender, age, household composition and usual resident size, mobility, the number of usual residences (one, two or none), and the type of living situation.

Because there were so many independent variables and our sample size was small (162), a forward stepwise selection procedure was used. Gender, age, household composition and usual resident size, and mobility were not significant with $\alpha=0.10$. The other two variables were significant. Inconsistency in the understanding of the living situations occurs more frequently for the group of persons who have "atypical" living situations. Also, the Black race/ethnicity group has more consistency than the Hispanic race/ethnicity category in terms of classifying living situations within the household.

In the second model we substituted the HTE variable for gender, age and race/ethnicity. The HTE did not prove to be a significant variable in this model, and thus we concluded that in this small subsample the living situations of the hard-to-enumerate population were not disproportionately misunderstood by a household respondent. Further analysis with a larger data set is needed to confirm this finding.

CONCLUSIONS

The three analysis sections: terminology, residence rules and living situations, are currently in focus as preparation begins for the 2000 census. Simple changes in census procedures such as not using the term 'usual residence,' not including all or some of the residence rules, expanding the current set of rules, or attempting to probe deeper for particular living situations that might be prone to incorrect enumeration, could produce unknown consequences. The addition of this paper confirms some previous assumptions.

The LSS showed that indeed, given a simple instruction using "most of the time" some persons were identified as usual residents incorrectly according to a time-based

definition. Most of the HHRs' responses are consistent with the definition as stated, but some respondents did not use the definition as we interpreted it. Perhaps their subjective interpretation of "most of the time" differed from ours (e.g., they used last year or last week and not the 2-3 month reference period). Or perhaps, they have their own idea about who lives at the house and those are the persons they will roster regardless of the instructions. The HHR refers to many of the HTE as usual residents even though they did not spend more than half of the time at the SHU. This implies that the HHR ignores the definition in some situations. Given a circumstance where the HTE are mobile and "float" between several residences, never spending a "most of the time" in any place, perhaps this incorrect enumeration according to the time definition is what a census or survey would prefer. This finding suggests that there possibly could be a larger undercount of the HTE persons if a "most of the time" assignment similar to the one in this analysis is actually used on the questionnaire.

Although the sample sizes are small and the LSS is not administered like the census, this work suggests particular residence rules might be counterintuitive to the "usual residence" term. We also observed that there appears to be a higher chance for misses than erroneous enumerations with the rules. Of the 9 percent of persons who had an atypical living situation, approximately 68 percent were enumerated correctly (as census would have enumerated them) and the remaining were enumerated incorrectly. This is encouraging given the complexities of the living situations. Only the rule pertaining to 'persons in a general hospital' was never violated. This suggest that most, if not all, of the rules are not obviously relayed with only the "most of the time" definition. We expect that there could be incorrect enumeration rate when rules are available but not read and/or understood. Therefore, if the residence rules are to remain the same, the census must find ways to communicate them to the respondents.

This analysis suggests there are not rampant misunderstandings of living situations (i.e., the number of usual residences) within the residence. Because HHRs frequently understand the living situations of persons within the housing unit, using them as usual residence informants is appropriate. When there are misunderstandings, it is frequently the case that these people have atypical living situations.

Inconsistency does not necessarily imply that person would be enumerated on a census form in error. In fact, there could be some form of inconsistency with

the person still being enumerated at the correct housing unit. This cannot be tested because the LSS was not conducted with the census format or in the census environment. The results presented in this paper only suggest possible upper bounds on the amount of potential error due to the different sources of inconsistency. The results confirm theories that these inconsistencies exist but are not widespread.

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Table 3: Consistency between HHR and Individual on Living Situation (N=162, Percents are weighted)

		HHR response				Total
		1 UR = SHU	1 UR (not=) SHU	2 UR, one is SHU	0 UR	
Person response	1 UR = SHU	98.36% (95)	0.31% (7)	1.32% (10)	0	94.54% (112)
	1 UR (not =) SHU	4.21% (2)	91.52% (18)	3.29% (3)	0.97% (1)	1.51% (24)
	2 UR, one is the SHU	50.86% (7)	11.27% (10)	37.86% (5)	0	2.61% (22)
	0 UR	0	96.69% (1)	0	3.31% (1)	1.26% (2)
	Missing Data	0	66.50% (1)	33.50% (1)	0	0.08% (2)
	Total	92.65% (104)	5.94% (37)	1.36% (19)	0.04% (2)	100.00% (162)

Table 2: Assignment of usual residence by census residency rules versus HHR's response to usual residence question for people in atypical living situations (N=323)

Living Situation	Persons in Atypical Living Situation			
	Should be Usual Resident at SHU per Census Rules		Should not be Usual Resident at SHU per Census Rules	
	A Usual Resident by HHR	Not a Usual Resident by HHR	A Usual Resident by HHR	Not a Usual Resident by HHR
1. Persons who usually live at the residence (90.63 %)				
2. Persons who didn't have one of the living situations listed in the census residence rules. A "most of the time" rule was applied to these persons. (4.68 %)	110	18	8	63
3. Persons who are temporarily away on a trip whether that be business or vacation (2.34 %)	40	11	0	0
4. Persons with more than one residence (1.29 %)	10	11	7	4
5. College students (0.40 %)	3	2	5	2
6. Persons in a general hospital, includes newborn babies (0.03 %)	5	0	0	1
7. Persons in the Armed Forces (0.07 %)	1	0	3	1
8. Persons who stay at a place for work only most of the week (0.05 %)	0	0	3	3
9. Persons with no other home who are staying here temporarily (0.48 %)	3	3	0	0
10. Persons who are in an institution such as a prison, mental hospital, or a nursing home (0.02 %)	0	0	4	0
11. Citizens of a foreign country (0.02)	1	0	0	1
Weighted Percent of "atypical" living situations	44.69 %	24.58 %	6.23 %	24.51 %

Endnotes

1. The coding of the individuals as to their census usual residence status was completed by the first author and was not a part of the design of the LSS. Future work could involve recoding of the persons by another individual. Comparing the two codings could give an indication on the amount of accuracy.
2. The term "living situation" is used in this section to discuss whether people have one, two or no usual residences. This is a different use than in the previous section.
3. $95.40 = (98.36 \times 94.54 + 91.52 \times 1.51 + 37.86 \times 2.61 + 3.31 \times 1.26) / 100$