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**Language Use and Linguistic Isolation:
Historical Data and Methodological Issues**

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U. S. Census Bureau

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1. Introduction

In 1990, a non-English language was spoken in an estimated 9.6 percent of all households in the United States. This level has almost certainly increased substantially since 1990, because of high levels of immigration in the past decade. Household language may pose a barrier to effective administration of surveys.

In this paper, we discuss the current Census measurement of household language, English language ability, and linguistic isolation, review evidence on non-English language use, and consider the characteristics of households and areas affected by high rates of linguistic isolation. Because in recent years data on linguistic isolation have been used to target survey activity and suggested as a means of focusing social programs, we consider several related measurement issues with important pragmatic implications for potential uses of these data. Both policy and procedural uses of the concept hinge on the assumption that linguistic isolation represents a barrier to effective communication. Finally, because it is often assumed that linguistically isolated households are geographically concentrated to an extent that would justify targeting communications to those areas in other languages, we consider some evidence relevant to these issues.

2. The concept of linguistic isolation

Interest in identifying the population which does not speak English is fairly recent in the more than 200 years of the U.S. Census. Language questions were not included in the first 10 censuses. In 1890 and 1910 language was asked only for persons who did not speak English. In most censuses from 1900 to 1970 (except 1910 and 1950) the only language question asked was mother tongue and it was generally asked only of the foreign born. (McArthur, 1981.) In 1890 about 1.7 million and in 1910 about 3.1 million people were reported as unable to speak English. In both years this represented about 4 percent of the population. By comparison in 1990, about 1.8 million (0.8 percent) could not speak English at all, and about 14 million (6 percent) of the population had some difficulty.

The current language questions were developed for the 1980 Census in an effort to respond to the necessity to know about current language use and limited English language proficiency. The need for accommodation of people who are unable to communicate in English was supported by legislation, or more accurately, interpretation of legislation, specifically the Civil Rights Act of 1964, the Bilingual Education Act, and the Voting Rights Act. The legislation grew out of recognition that an individual's inability to communicate in the common language can hamper access to employment,

transportation, medical and social services, voting, and children's participation in schooling. The Voting Rights Act (as amended in 1982), calls for the Director of the Census to determine whether more than 5 percent of the citizens of voting age of a State or political subdivision are members of a single language minority (defined in the Law in terms of race and Hispanic origin), cannot understand English adequately to participate in the electoral process (using English language ability data from the census) and have an illiteracy rate (defined in the law in terms of educational attainment) higher than the national average (Census Bureau, 1997). If so, registration and voting materials must be provided in languages other than English and Census language data are used in determining the language(s).

The legislation thus required measures of language use, and (since speaking another language does not preclude facile use of English), a measure of English proficiency. To meet the needs described, the approach in the census was to measure current language use at home and self-reported English language ability. As we will see, "linguistic isolation" is constructed from these measurements. The current census language questions are: "Does this person speak a language other than English at home? (Yes/no)" "What is this language?" and "How well does this person speak English? (very well, well, not well, or not at all)". Thus the 'foreign language population' identified by these questions is restricted to those who speak a language other than English at home, at least occasionally, not all who can or do speak a language other than English. Clearly these questions do not identify the 'foreign mother tongue' population.

In 1990, more than half of the 32 million people who reported speaking a non-English language at home reported speaking English very well, 23 percent reported speaking English well, 15 percent not well, and only 6 percent not at all. As discussed below, research has shown that those who are reported able to speak English very well performed as well on tests using English written material as English-only speakers. The remainder performed worse on the test and could be labeled as having limited English language proficiency. They may require materials and instructions in another language in order to vote or secure basic services. There were about 14 million people in this group in 1990.

An entire household's inability to communicate in English can be even more of a barrier than an individual's inability. For example, in case of a national or local emergency, such households could not receive an emergency communication in English. The concept of "linguistic isolation" was developed in preparation for the 1990 census (Siegel, 1991) in order to provide estimates of the numbers and characteristics of households which might need assistance to communicate with government and social services, for example to follow instructions from Federal Emergency Management Agency (FEMA) in the event of a disaster.

Linguistic isolation may also serve as a barrier to receipt of medical and social services. In 1998, the Department of Health and Human Services proposed a revision of its rules for designating medically underserved populations and health professional shortage areas to incorporate linguistic isolation as one of several barriers to access to medical care (Federal Register, 1998).

"Linguistic isolation" is dependent on the English-speaking ability of all adults in a household. A

household is linguistically isolated if all adults speak a language other than English and none speaks English “very well.” Adult is defined as age 14 or older, which identifies household members of high school age and older. The linguistically isolated population amounted to 3 percent of households and individuals in 1990. This amounts to about one-fourth of individuals who spoke a language other than English at home and one-fifth of households in which a language other than English was spoken.

The current language questions refer to individuals and they can be manipulated to yield data about three aspects of non-English language use for individuals and two aspects of non-English language use for households. Thus, for persons: In 1990 there were 32 million people who spoke a non-English language at home in 1990. Forty-six percent of them or 14 million had at least some difficulty with English. And about 8 million people lived in linguistically isolated households.

For households: In 1990, a language other than English was spoken at home in 15.5 percent of the households. Twenty percent of those households — or 3.2 percent of all households — were linguistically isolated.

3. Collection of Census Data from Non-English Speakers

Not all people who speak another language have difficulty in English, but those who have difficulty and particularly those in households where everyone has difficulty — linguistically isolated households — are a probable source of increased nonresponse in the census and in surveys. Problems can arise if respondents cannot read questionnaires in English (or, perhaps, in any language), or if they cannot communicate with an interviewer attempting to administer a survey or census in English. In the past, language problems were handled informally by census enumerators who interviewed household respondents in person. Over the past few decades, there have been very substantial changes in how the census is conducted among the non-English speaking population. These changes have relied on language and linguistic isolation data, which have been increasingly adapted for procedural uses and to improve census operations.

Before 1970, enumerators dealing with language difficulties were instructed to get help from a family member or neighbor. Interpreters were available where large numbers of speakers of a foreign language were anticipated. The Census of 1970 was the first in which most forms were mailed out and mailed back, to be filled out by household respondents. In selected areas mailing packages contained instruction sheets in Spanish. In the 1980 census, in order to deal with the problem of nonresponse due to the inability of whole households to communicate in English, a Spanish language questionnaire was available to people who requested it. Assistance guides also were available for enumerators’ use in nonresponse follow-up. The respondent could read a narrative translation of the questionnaire in one of 32 languages while the enumerator filled out the English language questionnaire. In 1990 the procedure was similar, with a Spanish language questionnaire available on request and 32 language assistance guides. In 2000, each household received an advance letter from the Census Bureau shortly before the census forms were delivered. It allowed people to request a questionnaire in any of five languages (Spanish, Chinese, Korean, Tagalog, and Vietnamese). Over 2.25 million such requests were received, and nearly a million

were returned (Bitzer, 2000). For people who did not receive a census form or thought they had been missed, Be Counted forms in the same five languages, as well as English, were made available in public buildings and assistance centers for individuals to fill out and mail in. Assistance guides in 49 languages were available by mail, at census questionnaire assistance centers, at local census offices, from enumerators and on the internet. Telephone assistance was available in the five languages and English, and about .8 million requests for assistance in Spanish, Chinese, Korean, Tagalog, or Vietnamese were fielded (Bitzer, 2000). In addition to the written assistance, advertising in non-English languages was targeted to identified groups in local markets in Census 2000.

Census 2000 made new uses of language data in implementing the procedural changes. 1990 census data were used in deciding which languages to provide questionnaire translations for. The languages selected for translation accounted for large numbers of linguistically isolated households in 1990 and large numbers of immigrants since 1990 (ARTI, 1998). 1990 census language data were also used to identify areas in need of special attention during census enumeration. A “targeting database” was developed that scored census tracts according to their levels of several factors that made enumeration especially challenging (e.g., poverty, non-English language use, linguistic isolation, lack of telephones, large households, etc.) (U.S. Census Bureau, 1999b). The data base was used to target areas where special enumeration efforts were needed, such as Questionnaire Assistance Centers, distribution of Be Counted forms in various languages, special outreach and promotion efforts, special recruitment efforts, etc.

Most government surveys, including those conducted by the Census Bureau, have not moved so forcefully as Census 2000 did to accommodate non-English speakers. Household surveys still rely on informal translation and interpretation, although increasingly there are standardized Spanish questionnaire translations available for interviewers to use. McNally (2000) summarizes procedures for non-English speakers in major Census Bureau household surveys.

The fact that data on language use, English proficiency, and linguistic isolation are being used for procedural as well as policy purposes, prompts our interest in their quality and their suitability for the purposes to which they are applied.

4. Nonsampling Sources of Error and Evidence about Data Quality

Three principal sources provide information about the quality of data on language use and English proficiency: (1) item nonresponse (or allocation) rates, (2) the consistency of reporting in the census and a subsequent reinterview, and (3) validation studies using standardized tests of English ability. These address non-sampling sources of uncertainty or error in decennial census data on language and isolation. In addition, the language items are collected from a sample in the census, and this adds uncertainty of a well-understood kind.

Obviously, English proficiency affects respondents’ ability to complete English-language interviews either in a self-administered questionnaire or interviewer-administered mode. Interviews

for people who do not speak English very well are more likely to be given by proxy respondents (Kominski, 1989) or in a language other than English. (In 1980, 28 percent of the post-census reinterviews with or for people who spoke a non-English language were conducted in the other language or required an interpreter.) Thus, measures of data quality for language use and English proficiency are likely to be affected by the difficulties of surveying those with limited English language skills.

The three census questions are affected by various sources of measurement error, discussed below.

Language use: “Does this person speak a language other than English at home?” has certain ambiguities of meaning.

Respondents may be uncertain about the nature or extent of non-English language use which should be reported. For example, they may not know whether to mark “yes” if they practice speaking a language learned in school, or speak another language while visitors from outside the country are staying, or engage in other intermittent speech of a non-English language. Alternatively, some may interpret the question to be asking only about habitual speech. In 1980, instructions were provided in a separate booklet which asked people to report a language actually used with some frequency, not a language learned in school or spoken as a child but no longer used at home. Respondents probably consulted the instructions infrequently; in 1990 none were provided.

“At home” may be a second source of ambiguity, especially for recent immigrants who occasionally visit their home country and speak their native language when they do. Some non-immigrants may interpret “at home” to refer to their childhood home, in which a language other than English may have been spoken.

The question may not be very meaningful for individuals who live alone and do not talk to anyone at home.

In 1980, the item nonresponse or allocation rate was 8.2 percent. The L-fold index of inconsistency was 25, in the moderate range (U. S. Census Bureau, 1986). The Content Reinterview Survey (CRS) found overreporting in the “yes” category in the census, perhaps because of some of the ambiguities noted above. (The reinterview was interviewer-administered, so some respondent misinterpretations which would have been unchecked in a self-administered questionnaire might have been caught by the CRS interviewer.) Inconsistency was higher for Blacks, and for people who reported speaking French, or German, or a total of three languages other than English. Blacks had a lower proportion speaking another language than any other race group, about 6 percent. A large proportion of French and German speakers may be reporting languages learned in school and practiced at home.

In 1990, the allocation rate was 5.1 percent; the improvement may have been due to moving the items so they did not immediately follow questions about birthplace and the year a person came to the United States to stay. These latter questions invoke a person’s homeland, and in 1980 may have created a context that increased ambiguity and led people to misinterpret “at home” in the language question that followed. The L-fold index of inconsistency was 27, similar to 1980 (U. S. Census

Bureau, 1993). Hispanics reported more consistently than non-Hispanics. There was no evidence of net overreporting in the “yes” category. However, reinterview results suggested there may have been underreporting in the census of infrequent non-English language use, and overreporting of non-English language spoken in a childhood home; the errors appear to have balanced out.

Language spoken: “What is this language?” For people who spoke a non-English language, the allocation rate was 11.1 percent in 1980 and 12.3 percent in 1990, mostly due to nonresponse for the screener question. Most people who report speaking another language speak only one other language (80 percent based on 1990 reinterview results) and they report that language very consistently in the census and reinterview. In 1980, the L-fold index of inconsistency was 2 and in 1990 it was 5.2.

While the question may lack ambiguity on its face, responses may not contain all the information analysts would like. This question obtains the names people use for the languages they speak, and the names are not necessarily linguistically accurate. The attempt to code responses into a set of linguistically meaningful categories is a herculean undertaking (see Stevens, 2000, for some discussion of this problem).

English proficiency: “How well does this person speak English? (Very well, well, not well, not at all)”

The subjective character of this item makes it vulnerable to a variety of influences. There may be systematic differences in self versus proxy assessments of proficiency, confounded by the need for a proxy because of language difficulty. Situational factors may influence what standards a respondent adopts to judge his or her own English proficiency and that of others in the household, and different reference groups likely yield different judgments of proficiency. The English proficiency of the interviewer, of other members of a respondent’s ethnic group or community, or of native speakers of English, may provide the standard of comparison. A respondent’s own English ability may influence how he judges the ability of others in his household. Reports may differ depending on whether respondents are reporting on a census form or to an interviewer. Reporting in an interviewer-administered survey may be more vulnerable to the effects of social desirability and respondents’ desire to present themselves in a positive light. On the other hand, an interview constrains what a respondent can reasonably claim in terms of her own English proficiency. The census, which is self-administered, allows individuals to claim any level of proficiency they wish without fear of contradiction. However, a respondent who is having difficulty communicating in English during an interview cannot so readily overstate his proficiency, because his actual performance provides a reality check. Moreover, interviewers may make (and record) their own judgments of respondents’ English proficiency, which may be influenced by (for example) respondents’ accents or other irrelevant factors. (One might suppose interviewers would be more likely to record their own judgments about a respondent who is obviously struggling with English, when to ask directly might seem insensitive or rude.) Cultural factors may influence judgments, perhaps due to cultural influences on social desirability. McArthur (1991) speculates that Asians systematically underreport English proficiency, while Hispanics overreport it, due to cultural influences on reporting.

Perhaps because of its subjectivity, the census measure of English proficiency has been subjected to unusually intense scrutiny and analysis. A number of studies sought to validate the census item as a measure of English proficiency, and to investigate associations between it and related constructs, in particular English language literacy. The results may be summarized in a nutshell: low reliability but relatively high validity, and unknown bias.

The allocation rate for English proficiency was 8.9 percent, and inconsistency was high (60.3). There was a tendency to overreport “very well” or “well” in the census compared to the reinterview.

In 1980, reinterview respondents were asked whether they have difficulty filling out a form, such as a driver’s license or job application form, written in English. Responses to this item are highly correlated with the census measure of English-speaking proficiency, as shown in Table 1.

Table 1.—Percent who report having no difficulty filling out a form, etc. in English: 1980

Reported English-speaking ability:	Percent who report no difficulty filling out an English form
Very well	96%
Well	78%
Not well	38%
Not at all	5%

Source: Census Bureau, 1986: Table O, Ch. 4. (Question asked of persons older than 14)

Kominski (1989) analyzes a small sample (N=647) of matched cases from the 1986 National Content Test and its reinterview, and finds a similar steep decline in reported ability to read a book, magazine or newspaper in English with diminishing English-speaking proficiency, shown in Table 2.

Table 2.—Percent who say they can read a newspaper, etc. printed in English: 1986

Reported English-speaking ability:	Percent who can read a newspaper in English
Very well	98%
Well	93%
Not well	69%
Not at all	0%

Source: Kominski (1989).

In 1982, the Census Bureau conducted the English Language Proficiency Study (ELPS) for the Department of Education to verify and evaluate the measure (U.S. Department of Education, 1987). Age-specific standardized tests of English-understanding ability were administered to respondents, and reports of their English proficiency were also obtained using the census measure. The tests

included both written and oral components. Analysis demonstrated a strong correlation between the census measure of English-speaking proficiency and scores on the test. People who said they spoke English “very well” had scores close to the scores of native English speakers who served as the control group for the study; those who spoke English “well” or worse had significantly higher levels of failure (Kominski, 1989). These results supported the use of the measure to fulfill the requirement of the Voting Rights Act to identify people who “...speak or understand English adequately enough to participate in the electoral process...” (McArthur and Siegel, 1983), and indicated further that people who spoke English only “well” (or worse) had limited English proficiency and therefore required that materials be available in their language in order to vote (Kominski, 1985).

The various measures which comprise linguistic isolation thus are affected by different sources and degrees of measurement problems and unreliability. Overall, however, they appear to be valid. We note, however, that there have been no assessments of the reliability of the constructed linguistic isolation measure as a whole, a gap which would be useful to fill.

5. Characteristics of the linguistically isolated population

As shown in Table 3, non-English households (i.e., households in which one or more persons 14 or older speaks a non-English language at home) are poorer and less educated than the national norm, and include more recent immigrants. In 1990, 17 percent of non-English households were below poverty level, and 36 percent of householders had not graduated from high school. Linguistically isolated households are poorer still: 29 percent were below poverty level, and 57 percent of householders had not graduated from high school. The low levels of education in linguistically isolated households imply that lack of literacy skills in their own language is likely to characterize many of these households.

Table 3.—Characteristics of households defined by language use and isolation: 1990

	Total (in 1000s)	% of families below poverty	% of householders immigrated 1980-90	% of householders <high school grad
All households	91,994	12.72	2.52	24.72
Non-English language households	14,374	17.02	14.15	35.57
Linguistically isolated households	2,937	29.35	34.02	56.95

Source: U.S. Census Bureau, 1995.

In 1990, those most in need of language assistance were the recent immigrants. Forty-one percent of recent immigrants (1980 to 1990) lived in linguistically isolated households. Furthermore, levels of need differed between groups originating from different regions. The level of linguistic isolation among recent Asian immigrants was 39 percent, North America 48 percent, the former Soviet Union

64 percent, and Europe and Africa less than 20 percent (U.S. Census Bureau, 1995). Table 4 shows the variation in English language ability and degree of isolation for several language groups. These differences reflect differences in nativity, recency of immigration, levels of education, prior knowledge of English, and other factors.

Table 4.—English ability of persons speaking selected languages: 1990 (Numbers in thousands)

Language	Total speakers	Limited English ability	Linguistically isolated	% limited English ability	% linguistically isolated
All persons	230,446	13,982	7,619	6.1	3.3
Spanish	17,345	8,310	4,615	47.9	26.6
Chinese	1,319	791	528	60.0	40.0
Korean	626	384	246	61.2	39.3
Vietnamese	507	321	213	63.3	42.1
Tagalog	843	287	104	34.0	12.3

Source: U.S. Census Bureau, 1995.

The five language groups shown in Table 4 are those for which translated questionnaires were made available in Census 2000. The groups vary considerably in their levels of English proficiency and hence the difficulty individuals might have filling out an English-language questionnaire. In 1990, about one-third of the people reported speaking Tagalog at home reportedly spoke English less than very well, compared to about three-fifths of those who spoke Korean, Vietnamese, or Chinese. The language groups also vary considerably in their levels of linguistic isolation, and hence, we speculate, in the difficulty of obtaining information about them in a household survey. Thirty-nine to forty-two percent of Korean, Chinese, and Vietnamese speakers, 27 percent of Spanish speakers, and 12 percent of Tagalog speakers lived in linguistically isolated households. Other language groups with large numbers of speakers — French, German, and Italian — had small proportions linguistically isolated — 10, 10, and 13 percent, respectively. In future censuses it may be useful to consider levels of English proficiency and literacy as well as language use in planning how to target communications to different language groups. It probably is advisable to direct non-English language communications to language groups with limited English proficiency. In addition, it would be useful to collect additional data on literacy levels in the language. People who are not literate in their own language will not be helped by translating a questionnaire into that language. The point of this paper is to suggest that linguistic isolation is more relevant than non-English language use in shaping strategies for surveys which require a (single) household informant.

Use of a non-English language at home and linguistic isolation are not limited to immigrants. In 1990, 52 percent of people 5 years old and older who spoke a language other than English at home were born in the United States, as were 34 percent of those who spoke a language other than English at home and who spoke English less than “very well”. Thirty percent of the linguistically isolated population in that age group were born in the United States (U.S. Census Bureau, (1994?). The preservation of traditional languages among native peoples of the Americas and longstanding non-English language communities in various areas of the country are only part of what lies behind these figures.

6. Change in linguistic isolation over time

A major source of change in the population speaking languages other than English is migration, and as is well known, levels of migration have increased dramatically in the last 20 years. As part of this trend, the fraction of the population age 5 years and over reported as “foreign born” rose from 6 percent in the 1980 census to 9 percent in the 1990 Census.

Table 5 reports levels of language use and linguistic isolation for cohorts defined by year of immigration, in the 1980 and 1990 censuses. The trends are shown graphically in Figures 1-3.

Table 5.—Language use, English proficiency, and linguistic isolation of persons by year of immigration, 1990 and 1980. Numbers in thousands.

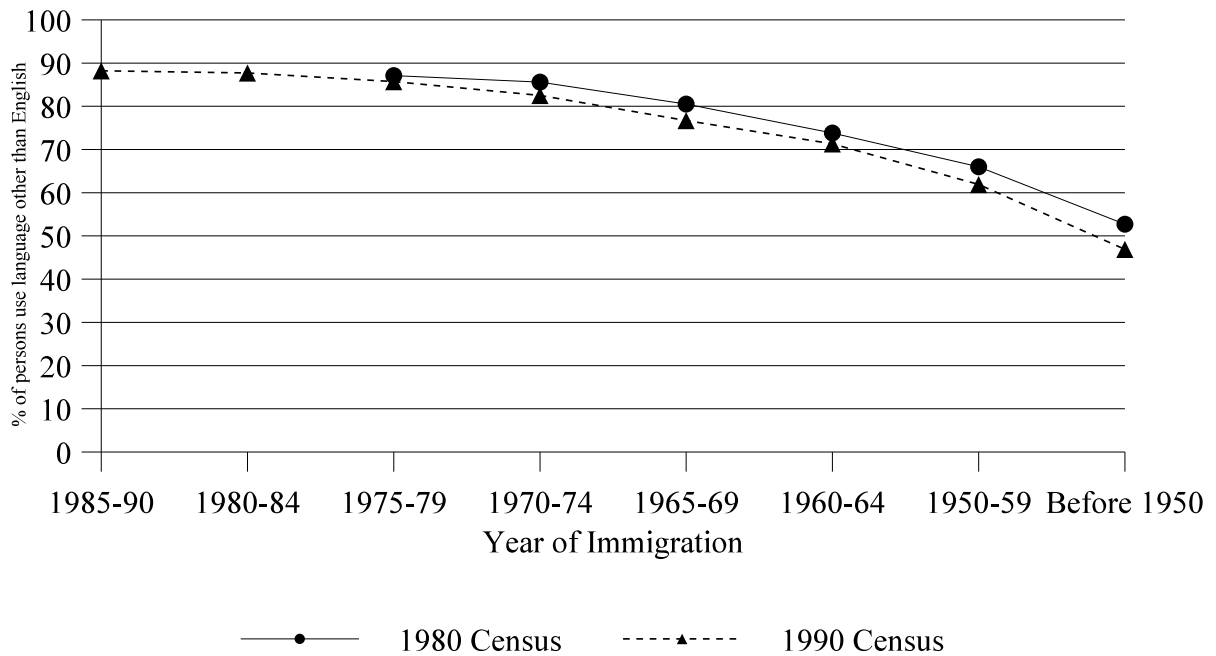
Year of Immigration	1990				1980			
	(1) Total	(2) % speak language other than English at home	(3) % who speak English very well (or only)	(4) % linguis- tically isolated	(5) Total	(6) % speak language other than English at home	(7) % who speak English very well (or only)	(8) % linguis- tically isolated
Total persons age 5 years and over	230,446	13.8%	93.9%	3.3%	204,522	15.4%	95.1%	3.0%
Immigrated 1985 to 90	4,614	88.2%	35.8%	44.4%	—	—	—	—
1980 to 84	3,788	87.7%	45.3%	35.7%	—	—	—	—
1975 to 79*	2,753	85.7%	52.3%	26.3%	3,056	87.1%	36.5%	47.3%
1970 to 74	2,117	82.5%	55.9%	18.9%	2,255	85.6%	48.5%	35.2%
1965 to 69	1,591	76.7%	60.6%	15.5%	1,797	80.5%	55.0%	26.7%
1960 to 64	1,201	71.3%	66.4%	13.7%	1,301	73.8%	62.8%	17.8%
1950 to 59	1,599	61.9%	71.6%	13.6%	1,888	66.0%	67.6%	14.6%
Immigrated before 1950	1,843	46.9%	78.6%	10.9%	3,274	52.7%	74.1%	14.3%
Native born	210,940	7.8%	97.7%	1.1%	190,952	11.2%	97.8%	1.2%

Source: U.S. Bureau of the Census, 1983, 1994, 1995.

*1980 Census tabulation includes people who immigrated January-April 1980.

Figure 1 graphs changes within and between immigration cohorts in use of a language other than English at home (corresponding to columns 2 and 6 in Table 5.) What is most striking in this figure, is the extent to which patterns of language use at home persist among immigrants — non-English language use among immigrants of a given period declines less from one census to the next than successive cohorts differ. The figure shows that immigration cohorts differ in the likelihood that they speak English at home, with immigrants who arrived after 1970 more likely to speak a language other than English. Cohort differences reflect differences in national origin, levels of education, and the language use patterns with which immigrants arrived. In the aggregate, there are only small intra-cohort increases over the decade in the use of English at home. These increases may reflect changes in language use by individuals, or selective return-migration or differences in mortality between those who do and those who do not speak a language other than English at home.

Figure 1.—Trends in use of a language other than English at home, by year of immigration: 1980 and 1990



This stability of language use at home among immigrants, which corresponds to a well-known feature of language preference (see Veltman, 1983), must not be mistaken for stability in English language ability. The two have quite different dynamics (see Lieberman and Curry, 1971). English proficiency increased within immigration cohorts from 1980 to 1990, with the greatest increases among the most recent arrivals (compare columns 3 and 7 in Table 5). Figure 2 shows the increase in English proficiency as a function of the number of years since entry into the U. S. The pattern is similar in 1980 and 1990, although levels of proficiency were slightly lower in 1990 than in 1980 for people with the same duration of stay. Figure 2 suggests that English language proficiency is a function of the length of time immigrants have lived in the United States.

Figure 2.—English proficiency, by number of years since U.S. entry: 1980 and 1990

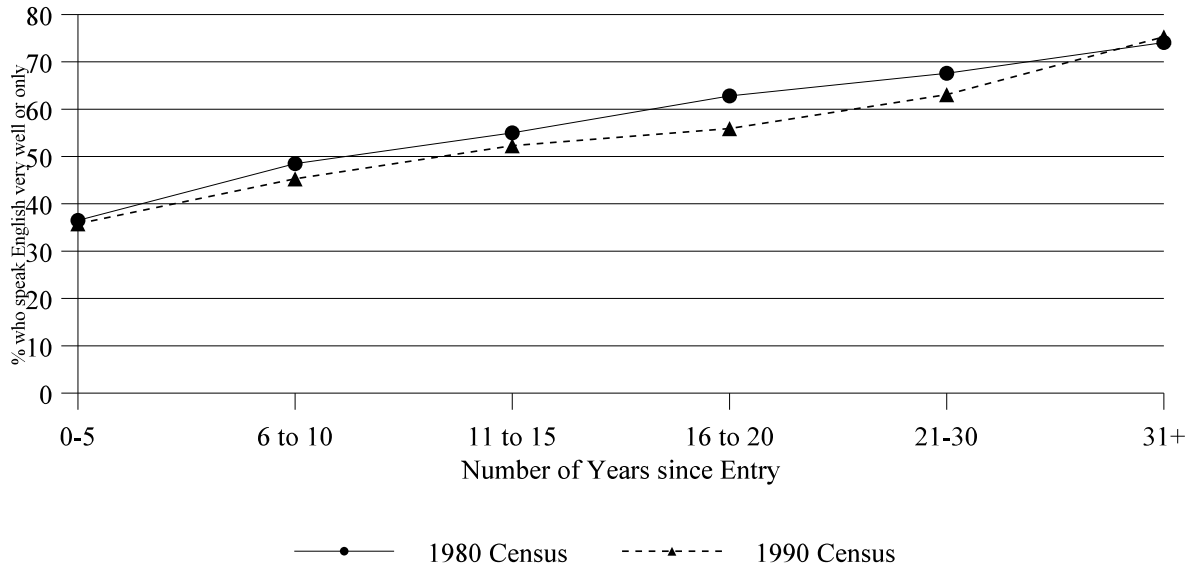
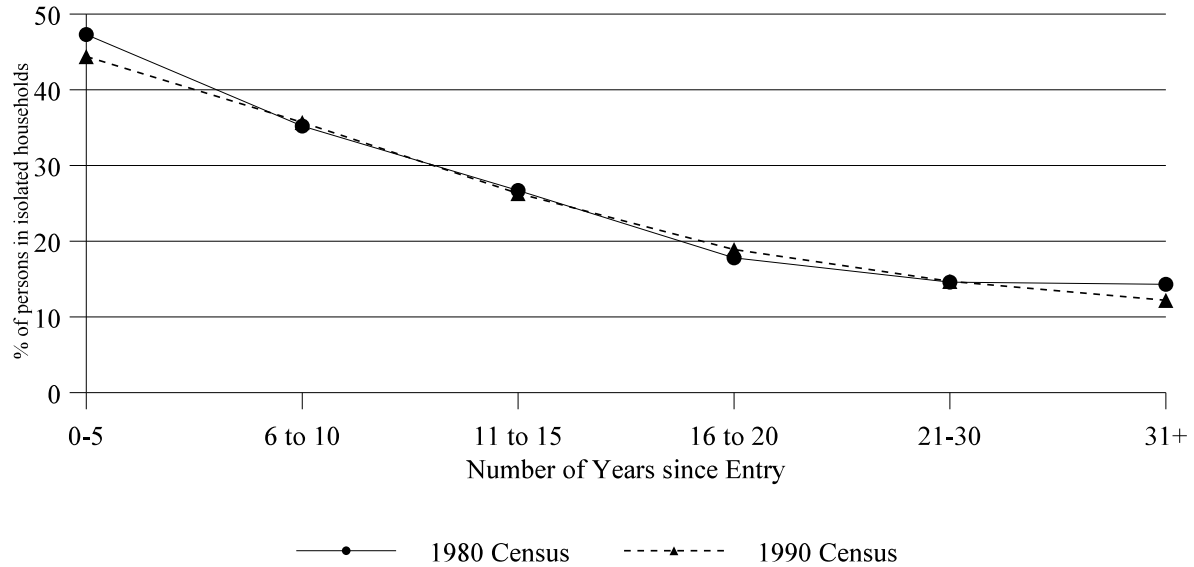


Table 5 also allows examination of the levels of linguistic isolation among cohorts of immigrants (compare columns 4 and 8). There are marked differences in isolation between successive cohorts, and the level of isolation declines from 1980 to 1990 for each cohort. Further, comparing estimates across cohorts within a census year shows a marked decline in the isolation of a cohort in the first 15 to 20 years after entry to the U. S., after which isolation appears to remain constant, at about 13 percent of the cohort. This is vividly shown in Figure 3, in which the cohorts in Table 5 are labeled by the number of years since their entry into the U.S. Figure 3 shows a pattern of steady decline in linguistic isolation as a function of the duration of time lived in the U. S. The decline levels off after two decades and the pattern is very similar in the 1980 and 1990 censuses. The causes of these cohort changes include acquisition of English language skills by members of the cohort, as well as other demographic changes such as mortality and return-migration. Along with this cohort demography, changes in the composition of households may also influence their linguistic isolation.

Whether a particular household is linguistically isolated depends upon the English ability of a subset of its members — those of age 14 and over. A household's linguistic isolation can change over time through the aging, death, birth, or "migration" of its members, even if the language ability of the individuals remains constant. The most obvious source of this kind of *demographic* change is the aging of children. Twenty percent of the 5-13 year-olds in linguistically isolated households in 1990 spoke only English. On their 14th birthdays, their households will no longer be linguistically isolated! In turn, as they leave the household — establishing their own residence elsewhere — their (former) household may revert to its former linguistic isolation. It should be clear from this cursory look that processes at several levels — acquisition of English language skills by individuals,

changes in composition of individual households, and differential return-migration and mortality—drive changes in the linguistic isolation of individuals and groups.

Figure 3.—Trends in linguistic isolation of persons, by number of years since U.S. entry: 1980 and 1990



7. Some cautions about using linguistic isolation for targeting

The utility of decennial census data on linguistic isolation as a basis for survey operations and the targeting of social services depends on some obvious properties of the available estimates: first, can areas high in linguistic isolation be identified with some degree of reliability? Second, how much of the linguistically isolated population resides in areas identified as having high proportions of linguistically isolated households? Third, to what extent do estimates from the decennial census identify linguistically isolated areas ten years later? And fourth, to what extent are areas with high proportions of linguistically isolated households homogeneous in the non-English language spoken?

a. Errors in identifying areas high in linguistic isolation

Estimates of the level of linguistic isolation in a community, county, or other small area are affected by sampling error. A program that aims to target special procedures or communications to areas high in linguistic isolation is less effective if such areas cannot be accurately identified.

The questions on language use at home and English language ability were administered to about one-sixth of the population in the 1990 and 2000 censuses. For small areas such as census tracts or counties, the uncertainty in the level of linguistic isolation that can arise because of sampling variation can be considerable, compared to the estimate itself. The 1990 Census presents generalized

variance functions (GVF) from which standard errors can be estimated for estimated proportions linguistically isolated (U.S. Census Bureau, 1992, Appendix C). These depend upon the number of households in an area, the estimated proportion linguistically isolated, and a coefficient which represents the achieved sampling rate for the area and a characteristic effect for linguistic isolation.

To illustrate the magnitude of uncertainty from sampling error, we calculate confidence intervals around the estimated percent of households isolated in each tract in Los Angeles county and in Harris and Fort Bend counties (part of the Houston Metropolitan Statistical Area), and ask how many of the 1990 Census estimates are significantly above or below a standard cutpoint (30% isolated) used to characterize small areas. (In 1990, 1 percent of the tracts in Los Angeles County and 2 percent of tracts in Harris and Fort Bend Counties contained no sample households.)

Table 6 shows that a large portion of the tracts that might be called highly isolated (i.e., tracts in which the estimated percentage of households linguistically isolated was 30% or more) cannot be said to be “isolated” with much certainty. Only about 60 percent of these “highly isolated” tracts in Los Angeles, and 20 percent in Houston, are significantly above the cutoff value. Therefore, the use of discrete cut points as the basis for decisions about tracts is likely to lead to substantial error in the treatment of particular tracts. If erroneously identifying or failing to identify a tract as highly isolated has consequences, this uncertainty should be taken into account. Certainly research in which these designations play a role should be cautious about their reliability when making inferences about associations between linguistic isolation and other characteristics of census tracts (Brucé, Robinson, and Wiedman, 2000).

Table 6.—Sampling errors affecting identification of tracts as above and below 30% isolated

		<30% Isolated		≥30% Isolated	
	Total tracts	Total tracts	Not significant	Total tracts	Not significant
Los Angeles	1637	1428	108	209	81
Houston	617	607	132	10	8

Source: U.S. Census Bureau, 1992.

b. Geographic concentration of linguistic isolation

People who speak languages other than English or have difficulty with English are not evenly distributed across the United States. In 1990, proportions who spoke a language other than English at home varied from 36 percent in New Mexico to less than 3 percent in some southeastern states. Half of the people who spoke Spanish at home lived in California or Texas and 4 of 10 speakers of Asian or Pacific languages lived in California. Two-thirds of the linguistically isolated population were in three states: California, Texas and New York.

The extent to which linguistically isolated households are concentrated in areas with high levels of linguistic isolation seems a major constraint on the utility of linguistic isolation as a means for targeting communications. If large numbers of linguistically isolated households reside in areas where they do not constitute a large fraction of the population, targeting to areas of concentration will miss them. We examine data from two areas with relatively high percentages of their households linguistically isolated, Los Angeles, California, and Harris and Fort Bend counties in Texas. While 3.2 percent of the households of the United States were linguistically isolated in 1990, 13 percent of households in Los Angeles and 6 percent of households in these Texas counties were (U.S. Census Bureau, 1992.) The counties we examine do not comprise the entire metropolitan area of which they are a part. The level of linguistic isolation of households at the county level suggests that counties may be too large to afford small areas for the purposes of targeting, though we have not examined levels of linguistic isolation for all counties.

Table 7 presents the distribution of all households, and all linguistically isolated households, over census tracts categorized by level of linguistic isolation (i.e., the fraction of households in a tract that are linguistically isolated). The similarity of the distributions of tracts and households within areas is evidence that tracts tend to be roughly the same size whatever their level of linguistic isolation. (This is not necessarily the case for arbitrarily chosen areas, and Los Angeles has somewhat smaller tracts on average — 1400 households — than the Texas counties — 1700 households.) Relative to all households, linguistically isolated households tend to be concentrated in tracts in which more households are linguistically isolated. For instance, in Los Angeles County, 36 percent of linguistically isolated households are found in tracts with the highest level (>30%) of linguistic isolation; while only 12 percent of all households are found in such tracts, that is, isolated households are three times as likely as all households to be found in these tracts. In Harris and Ft. Bend counties, isolated households are seven times as likely as all households to be found in the tracts with the highest level of isolation (the Gini coefficient of concentration is .52 for Los Angeles and .46 for the Texas counties.) However, from the standpoint of efficient targeting, one might wonder at the fact that in Los Angeles, close to half, and in Houston, close to three-quarters of the linguistically isolated households are found in tracts in which fewer than 20 percent of households are linguistically isolated. In Los Angeles, only 36%, and in Houston, only 7%, of linguistically isolated households are in tracts with high proportions of isolated households. Potential users might well ask whether decennial-based census linguistic isolation data are appropriate instruments for the purposes and areas contemplated. The strategy of targeting of language communications to small areas rests on the assumption that linguistically isolated households are geographically concentrated, and this premise appears questionable. It is also worth noting that non-English language households are more uniformly distributed over tracts than are linguistically isolated households.

Table 7.—Distribution of households and of census tracts across levels of linguistic isolation (defined as percent of households linguistically isolated in a census tract) for selected counties, 1990.

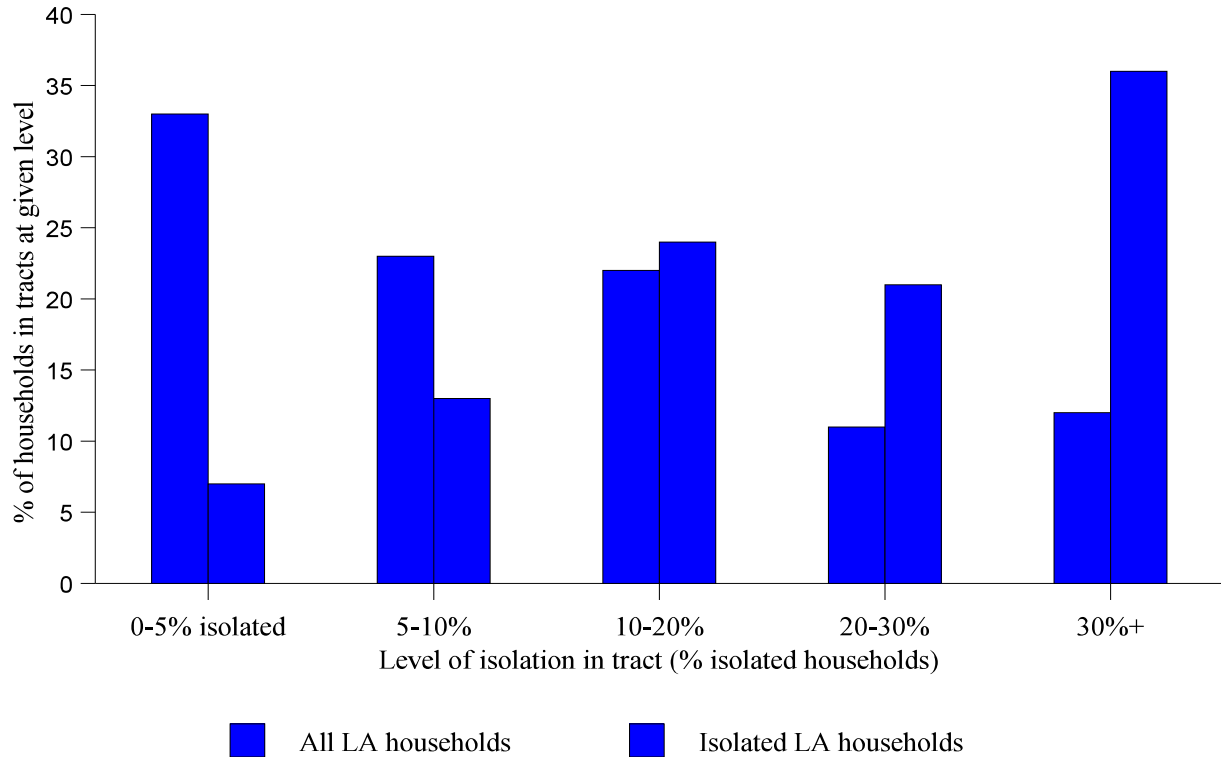
% of Households in tract linguistically isolated	Los Angeles County, CA				
	Number of tracts in Area	% of tracts	% of households	% of LOTE* households	% of all isolated households in county
Total	1652	100%	100%	100%	100%
missing**	15	1%	—	—	—
0 to 4.9%	535	32%	33%	17%	7%
5 to 9.9%	363	22%	23%	19%	13%
10 to 19.9%	345	21%	22%	24%	24%
20 to 29.9%	185	11%	11%	17%	21%
30 to 100%	209	13%	12%	23%	36%
Harris & Fort Bend Counties, TX					
Total	631	100%	100%	100%	100%
missing**	14	2%	—	—	—
0 to 4.9%	356	56%	56%	37%	20%
5 to 9.9%	136	22%	25%	28%	29%
10 to 19.9%	79	13%	12%	19%	25%
20 to 29.9%	36	6%	5%	11%	19%
30 to 100%	10	2%	1%	4%	7%

Source: U. S. Census Bureau, 1992.

*Households in which a language other than English is spoken.

**Tracts for which the percent of linguistically isolated households is “missing” are tracts in which there were no households in the 1990 Census sample.

Figure 4. – Geographic concentration of households in tracts of various levels of linguistic isolation: Los Angeles County, 1990



Is linguistic isolation a stable characteristic of tracts? Comparison of 1990 Census data with data from the American Community Survey (ACS) test sites in Harris and Fort Bend Counties affords an early opportunity to assess the stability of tract-level linguistic isolation over an eight-year period. Brucé, Robinson, and Weidman (2000) present a graphical representation of the comparison of 1990 Census and 1998 ACS measurements of the percent of households linguistically isolated in the tracts of these two counties. As shown in Table 8, 96 percent of the 606 tracts with sample data were consistently classified as above or below the 30% cutpoint in 1990 and 1998. However, identification of highly isolated tracts was much less consistent than this overall result might suggest.

Table 8.—Classification of census tracts by level of linguistic isolation, in 1990 and 1998, for Harris and Fort Bend Counties, TX

% Linguistically Isolated in 1990 (Census)	% Linguistically Isolated in 1998 (ACS)	
	< 30%	≥30%
< 30%	575	24
≥30%	0	9

Source: Brucé, Weidman, and Robinson, 2000. Unpublished tabulations.

Note: 25 tracts having no sample data for one or both years are excluded.

While all 9 tracts classified as 30 percent or more linguistically isolated in 1990 were similarly classified in 1998, 24 of the 33 tracts identified as having 30 percent or more linguistically isolated households in 1998 would not have been identified on the basis of 1990 census data. In other words, 73 percent of the highly isolated tracts in 1998 would have been missed if 1990 census data were used to target isolated tracts. The Houston area experienced tremendous growth from 1990 to 1998, and the surprise may be that 1990 data provide as good predictions as they do of the levels of linguistic isolation of tracts in 1998. The point is that cities will differ but all may be subject to this level of fluctuation in the interval since the most recent census. While the American Community Survey will offer more timely estimates for all tracts, starting in 2008, it will still be subject to the uncertainty arising from sampling variation which was alluded to above, and which has not been taken into account in the analysis in this section.

Finally, some consideration must be given to whether targeting communications to linguistically isolated areas in a single non-English language is likely to prove an effective strategy. Table 9 shows the “dominance” of a single (non-English) language in tracts in the two areas we have been using as exemplars. The dominant non-English language in a tract is the one spoken by the largest number of people.

Table 9. Language dominance and linguistic isolation of tracts, Los Angeles, Ft Bend, and Harris Counties, 1990

Percent of households in tract that are linguistically isolated	% of non-English language speakers who speak the dominant language of the tract	
	Los Angeles County	Ft Bend and Harris Counties, TX
All tracts	71%	76%
0 to 4.9%	47%	64%
5 to 9.9%	57%	71%
10 to 19.9%	71%	87%
20 to 29.9%	82%	91%
30% or more	84%	96%

Source: U.S. Census Bureau, 1992. Languages are grouped into 25 categories.

In general, more than 70% of the people in a tract who speak a language other than English speak the same language. In addition, there is a marked association between the extent to which a single language dominates in a tract and the extent to which households within it are linguistically isolated. (The squared correlation between percent of people speaking the dominant language of each tract and the percentage of its households linguistically isolated is about .2 within each of the three counties.) We cannot tarry to offer speculations about how isolation affects language dominance and *vice versa*. It is worth noting, however, that if one picks the right language for the tract, targeting communications in a single language other than English can reach a large proportion of those who speak a language other than English, especially in tracts with higher percentages of linguistically isolated households.

c. Does linguistic isolation create a barrier?

Some evidence on this question is available from ethnographic research on causes of census undercount. In the 1990 census, ethnographers were contracted to evaluate causes of undercount in 29 sites which were purposively selected to include groups and areas likely to be undercounted (Brownrigg and de la Puente, 1993). *Language and illiteracy barriers* was one of 5 hypothesized causes investigated (Brownrigg and Martin, 1989). However, as it turned out, high proportions of non-English speakers in a site was not predictive of coverage errors, controlling for other factors (Ellis, 1995). This may have occurred because many of the sites had strong local outreach census programs that helped residents overcome language barriers (de la Puente, 1993).

As noted above, 1990 Census measures of various factors, including linguistic isolation, that are thought to impede census enumeration were used to score census tracts according to a “Hard to

Enumerate Index.” Brucé, Robinson, and Weidman (2000) show that the “Hard to Enumerate Index” for tracts affords some purchase on response rates in the 1998 Census Dress Rehearsal, but the efficacy of linguistic isolation by itself is not shown.

Evidence from a field experiment conducted in 1993 suggests that communicating with non-English speakers in their own language may help overcome language barriers. Two strata were defined as low (areas with 15 to 30 percent linguistically isolated households) or high in linguistic isolation (30 percent or more linguistically isolated households). Households were randomly assigned to receive either an English language questionnaire, or both Spanish and English language questionnaires, with instructions to fill one out and mail it back. Courteville (1994) found that including a Spanish questionnaire significantly improved completion rates (by 2-6 percentage points) in the high isolation stratum. But in both strata, almost a third of the forms returned were Spanish language.

It is important to note that the strategy of sending out census questionnaires in languages other than English to non-English speakers rests on the assumption that they are literate in their own language. That is not necessarily the case, and when it is not, non-English speakers will be no more able to fill out and return a questionnaire in their own language than a form in English. As noted earlier, non-English language speakers generally have lower levels of education, suggesting that literacy is likely to be a problem for some. Data from a 1986 survey imply that 22 percent of non-English speakers could not read a book, magazine, or newspaper printed in their language, and 27 percent could not write a postcard in the language (see Kominski, 1989, Table 5). These results, although not based on a representative sample, suggest fairly high rates of illiteracy in their own language among non-English speakers. (See also Stevens, 2000.) This conclusion is consistent with the finding that in the experimental mailout of English and Spanish forms, the quality of the data was lower in the Spanish language forms than in the English forms (de la Puente and Wobus, 1995). In qualitative research involving (primarily) monolingual Spanish speakers, Kissam, Herrera, and Nakamoto (1993) found that Hispanics with less than 6 years of schooling found it very difficult to complete the 1990 Spanish language census long form without active and constant assistance. The difficulties were more related to a lack of literacy skills required for successful forms completion (i.e., lack of understanding of the conventions used in formatting questionnaires and similar forms) than to other lexical or dialectical difficulties. They found near-universal preference for face-to-face enumeration by bilingual enumerators in their limited sample.

8. Some concluding thoughts

This paper has reviewed the conceptual underpinnings of the census data labeled “linguistic isolation”. It has attempted to clarify the distinction between individual and household use of non-English languages, English language ability of individuals, and the linguistic isolation of households and their members. It has reviewed much of the evidence there is dealing with non-sampling error in the measurement of the elements of linguistic isolation, and presented some elementary cautions about the levels of uncertainty in estimates for small areas arising from sampling variation in the census and other surveys. It is somewhat ironic that linguistic isolation can most likely be most useful for programmatic uses and survey administration as a characteristic of areas as small as census tracts, but that the measurements are subject to great sampling variation at this fine geographic level.

It is noteworthy that Census 2000 had originally planned to mail out translated questionnaires to linguistically isolated areas. However, this plan had to be abandoned after the 1998 Dress Rehearsal, in part because the “Census Bureau learned that it could not accurately target linguistically isolated households ... and was unlikely to reach more than 12 to 18 percent of that population” (Census Bureau, 1998). The problems were those of unreliable estimates of linguistic isolation for small areas and outdated data on which to identify them.

Finally, there are two questions on the validity of interpretations of “linguistic isolation” which need further investigation to justify using it in social programs and in survey administration:

First: Are the assumptions about the levels of proficiency built into the measurement of English language ability and linguistic isolation still appropriate? If the complexity of the messages in programs and surveys has changed, does speaking English less than “very well” represent an appropriate threshold? And does the level of English proficiency required to link a household to the larger society dictate that someone younger than 14 years could not serve as that link no matter what her proficiency in English?

Second: Do English language ability and linguistic isolation represent barriers to effective communication in surveys? There are, of course, political and ideological arguments over whether communication in English is or should be adequate for government programs, but the importance of language as a barrier to survey administration needs direct assessment. This entire paper has proceeded as if the answer was known or beyond question. In fact, the only evidence we know of which bears directly on this point (Lestina and Griffin, 2001) is preliminary, and somewhat difficult to interpret. It shows that among households in which a language other than English is spoken, which responded to the American Community Survey, linguistically isolated households are more likely to have required telephone or personal visit followup than households not linguistically isolated. This difference varies by language and from community to community. Clearly further research is needed, and Census 2000 and the American Community Survey provide the opportunity to firmly quantify this difference, and investigate its effects on data quality. But it is clear that linguistic isolation does affect survey participation in ways that should be addressed in the design of future inquiries.

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