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Mitchell, Ross E.
Young, Travas A.
Bachleda, Bellamie.
Karchmer, Michael A.

Sign Language Studies, Volume 6, Number 3, Spring 2006, pp. 306-335 (Article)

Published by Gallaudet University Press
DOI: 10.1353/sls.2006.0019

ROSS E. MITCHELL, TRAVAS A. YOUNG, BELLAMIE BACHLEDA, AND MICHAEL A. KARCHMER

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Why Estimates Need Updating

In the United States, home language use surveys are now commonplace. The decennial census has included inquiries about home language use within immigrant households since 1890 and within all U.S. homes since 1970 (see U.S. Census Bureau 2002a, hereafter cited as *Measuring America*). Public schools, originally to comply with the Bilingual Education Act of 1968, authorized in Title VII, Part A, of the Elementary and Secondary Education Act, routinely collect home language use data for each student enrolled. The number of languages used in homes in the United States, as identified by the various federal and state surveys, is quite large. However, American Sign Language (ASL) is not on the list of non–English

Ross E. Mitchell is a research scientist with the Gallaudet Research Institute at Gallaudet University. Travas A. Young is a doctoral student in the Department of Linguistics at Gallaudet University. Bellamie Bachleda is a psychology major in the College of Liberal Arts, Sciences, and Technology at Gallaudet University. Michael A. Karchmer is Director of the Gallaudet Research Institute and Professor in the Department of Educational Foundations and Research at Gallaudet University.

The authors would like to thank the librarians of the Library of Congress and the U.S. Census Library, especially Kristina Bobe, for their assistance and Robert E. Johnson for his helpful commentary.

languages used in the home, and no state in the union counts its users in either the general or the school population.

Conspicuous by its absence in U.S. language census data is an estimate of how many people use American Sign Language in the United States. We have found that California records sign language use in the home when children enter school (e.g., California Department of Education 2004); the Annual Survey of Deaf and Hard of Hearing Children and Youth (hereafter cited as Annual Survey) collects data on sign language use by family members with their deaf or hard of hearing children (e.g., see Mitchell and Karchmer 2005). However, there is no systematic and routine collection of data on sign language or ASL use in the general population. Given that estimates of the number of people who use ASL are relatively easy to find in research and practitioner publications, as well as scattered across the Internet, and range from 100,000 to 15,000,000, we decided to track down their sources.

In this review of the literature on the prevalence of ASL use in the United States, we identify a number of misunderstandings. To make sense of them, we focus on two documents in particular: first, a statement presented during the U.S. Senate hearings for the Bilingual Courts Act of 1974 about how sign language use ranks in comparison to other non–English languages in the United States (Beale 1974) and, second, the findings from the National Census of the Deaf Population (NCDP; see Schein and Delk Jr. 1974). This in-depth review clarifies the meaning of the original statement for the Bilingual Courts Act of 1974 hearings and provides a more justifiable estimate of the number of signers. This number does not necessarily include all ASL users, based upon the NCDP, which is the only research study from which data-based estimates may be derived.

Before we consider these earlier works, however, we offer some background on the problems of obtaining accurate (let alone current) estimates of how many people use ASL in the United States from large-scale, ongoing national data collection efforts. These include the decennial census of the U.S. population and its companion projects, the Current Population Survey (CPS) and the American Community Survey (ACS), as well as surveys commissioned by other

federal agencies, in particular, the National Health Survey (NHS) and the Survey of Income and Program Participation (SIPP).

Demography of Language and Deafness

We focus on two demographic research categories: (1) ASL as a language of national origin and (2) deafness. For more than a century, the federal government has mandated national census counts, or census-based survey estimates, of non–English language use in the U.S. population. Also, originally as an activity of the U.S. Bureau of the Census and then, after a delay of several decades, a U.S. Public Health Service responsibility, there have been regular estimates of the prevalence of deafness and other disabilities in the country. In this section we review some of the specifics of these two demographic categories—language and deafness—and suggest that these distinct projects require a unified perspective before ASL use is likely to be included as part of the demographic description of the U.S. population.

Language Census History

A review of the language data collection history of the U.S. Bureau of the Census reveals that the absence of ASL is not surprising (*Measuring America*; U.S. Bureau of the Census 2004, B29–B32). With the exception of 1950, the decennial census has included questions about *speaking* English or other languages as a standard part of the "long form" since 1890. However, through the 1960 decennial census this inquiry was restricted to foreign-born people in the population. Beginning in 1970, the question about non–English language use followed—but was no longer linked to—questions about nativity (see *Measuring America,* 1970 questionnaire, question 17, p. 78). Both native-born and foreign-born people were now legitimate respondents. Nonetheless, the question remained an inquiry about what "was *spoken* in this person's home when he was a child" (ibid.; emphasis added). In 1980 an additional question about "how well" an individual speaks English became standard (ibid., 1980 questionnaire, question 13c, p. 85). In 1990 the language use question no longer directly followed the nativity questions but instead followed inquiries about ancestry or ethnic origin (ibid., 1990 questionnaire, question 15, p. 92). The sequence of inquiries for Census 2000 was ancestry,

language, and then nativity (ibid., 2000 questionnaire, questions 10–12, p. 101). The important point is that, though the context of the question has varied, native-born respondents have been able to declare speaking a language other than English in the home since the 1970 decennial census.

In addition to noting the century-old spoken-language emphasis of census data collection, which might cause signers to hesitate declaring their use of ASL at home, there is an official intent for each of the questions related to non–English language use at home: ''This series of questions is used to identify the populations who have difficulty communicating in English. . . . Together, these items identify the size and location of populations who may be isolated by their limited English proficiency and by the languages in which they can communicate'' (U.S. Bureau of the Census 1998, 50).

Given that some deaf ASL users ''have difficulty communicating in English'' and are ''isolated by their limited English proficiency and by the languages in which they can communicate'' (e.g., Johnson, Liddell, and Erting 1989; Mitchell and Karchmer 2004b; Kelly 1987; Schein 1989; Smith 1996), we might imagine that ASL would be counted among non–English languages ''spoken'' at home. However, this is not the case. In the initial data-processing phase, the census codes any mention of an American signed language as English, apparently on the curious grounds that signed languages are not written and therefore cannot be included in ballot materials (Day, personal communication). Despite the ever-growing literature on the linguistics of signed languages (e.g., Armstrong, Karchmer, and Van Cleve 2002; Chamberlain, Morford, and Mayberry 2000; Emmorey and Lane 2000; Liddell 2003; Valli and Lucas 2001; Wilcox and Peyton 1999), historical signing communities in the United States (e.g., Groce 1985; Lane, Pillard, and French 2000), and the growing popularity of ASL in U.S. colleges and universities (Welles 2004), data on reported ASL use are never encoded in the computerized files and consequently do not appear in U.S. census reports.

Population of Deaf People

ASL and early onset deafness are intimately associated with one another. Lane, Hoffmeister, and Bahan (1996) offer a perspective of

what it means to be Deaf in the United States: "When we refer to the DEAF-WORLD in the U.S., we are concerned with a group . . . possessing a unique language and culture" (ix). "Signed language is the most important instrument for communicating in the DEAF-WORLD. . . . From the day Deaf Americans enter the DEAF-WORLD, ASL becomes their primary language, and is, in itself, a big chunk of DEAF-WORLD knowledge" (6). Given this point of view, it makes sense to look at what we are learning from studies of the demography of deafness, rather than from non–English language census reports, for routine collection of data of relevance to ASL use in the United States.

Unfortunately, in the United States, deafness is treated predominantly as a matter of public health and social welfare policy, not primarily as a social and linguistic phenomenon within the general population. From 1830 to 1930, the U.S. Bureau of the Census (*Measuring America*; Best 1943; Schein and Delk Jr. 1974) was charged with counting the U.S. deaf population, but no provision was made for inquiring about sign language use within it. An examination of the questions on the census forms suggests that the intent was at first to enumerate the segment of the U.S. population with disabilities and others who might otherwise be noted for their "infirmity or misfortune" or have been "convicted of a crime" (1850; see *Measuring America,* 11). Later, poverty and criminality were separated from the cluster of questions pertaining to specific disabilities.

The inquiry about deafness was not consistent for each decennial census. Initially, the interest was in counting those who were "deaf and dumb"; that is, "deafness merely, without the loss of speech, [was] not to be reported" (ibid., 7, 15). Later, in 1890, enumerators were to note, "if a person is mentally or physically defective, the nature of the defect" (ibid., 32). In other words, deafness counted; loss of speech was not a necessary co-occurring condition. However, in 1900 instructions again emphasized that the person be "*both* deaf and dumb . . . to be reported" (ibid., 55; emphasis in original). Though this inconsistency was far from the only problem, serious concerns about data quality resulted in specific disability questions being dropped from the decennial census after 1930 (Schein and Delk

Jr. 1974). Not until the 2000 decennial census did a question on sensory disability return to the long form. When it did, the question did not separate blindness from deafness but, astonishingly, considered them together (see *Measuring America,* 102, question 16a).

The collection of national data on deafness (and other disabilities) is now driven largely by the priorities of the U.S. Public Health Service and the Social Security Administration in the form of two national survey programs: the National Health Survey (see National Center for Health Statistics 1963) and the Survey of Income and Program Participation (see U.S. Bureau of the Census 1986). The former published its first estimates of the prevalence of deafness in 1965 (Glorig and Roberts 1965), the latter in 1986 (U.S. Bureau of the Census 1986). Neither of these data collection programs has ever inquired about sign language or ASL use.

A Unified Perspective

Is ASL use more a disability-related question or a language-use issue? There is an irony in such an either-or construction of the question. Establishing a person's degree of hearing loss or deafness for both the NHS and SIPP depends on responses to questions about that person's difficulty in hearing normal conversation (e.g., Mitchell 2005, 2006). In other words, someone with a hearing loss or deafness must "have difficulty communicating in English" (or any other spoken language). Otherwise, this particular disability would not exist.

At the same time, difficulty in hearing normal conversation, which interferes with spoken communication, most often occurs as a result of age-related hearing loss. The overwhelming majority of people categorized as deaf by the NHS and SIPP are fluent speakers of English (or some other spoken language) and did not experience any difficulty in hearing until well into adulthood (e.g., Blanchfield, Dunbar, Feldman, and Gardner 1999; Mitchell 2005, 2006). As a consequence, most people who are audiologically deaf do not use sign language.

More to the point, it is clear that ASL is used in homes with family members who are not deaf (Higgins 1980; Lane, Hoffmeister, and Bahan 1996; Meadow-Orlans, Mertens, and Sass-Lehrer 2003;

Mitchell and Karchmer 2005; Schein 1989). Less than 5 percent of deaf children have deaf parents, and more than 80 percent of the children born to deaf couples have no hearing impairment (Mitchell 2004b; Mitchell and Karchmer 2004a; Schein and Delk Jr. 1974). Deafness and ASL use should not be conflated. Not everyone with a significant degree of hearing loss uses ASL or participates in a signing community (e.g., Dugan 2003; Kisor 1990). At the same time, when people with no hearing loss are born into families who use ASL, they grow up with ASL as their first language (e.g., Finton 1996; Mudgett-DeCaro 1996; Padden and Humphries 1988). Signed language use in the United States is undoubtedly related to the existence of deafness in the population, but its prevalence in the home is certainly not restricted to those who are deaf.

Moreover, the lack of a one-to-one relationship between deafness and ASL use means that knowing how many people are deaf does not allow us to estimate how many people use ASL. An independent study of sign language or ASL use is required. In addition to identifying an empirical source for sign language use data, our review of the evidence leads us to believe that accepting the twin fallacies that all deaf people use ASL and that all ASL users are deaf has generated some of the numbers currently circulating. In other words, American Sign Language is a social and linguistic phenomenon, for which deafness is a necessary human condition motivating its sustained use (Johnston 2004), but an individual's deafness is neither a necessary nor a sufficient condition for becoming an ASL signer. Finding all those who use ASL at home requires a survey of people without regard to their hearing status.

Methods

Similar to any review of research literature, we depend on tools such as search engines, databases, major reference works, and citation indices to locate our sources. However, because our topic of interest is any reference to an estimate of the number of people in the United States who use ASL, regardless of attribution to its source, a comprehensive and exhaustive search is not possible. Instead, we searched the Internet (using Google, followed by a trail of various links once productive sites were identified), topical research databases (ERIC,

PubMed, LexisNexis Academic Universe, and PsycINFO), a major reference work (*Gallaudet Encyclopedia of Deaf People and Deafness* [Van Cleve 1987]), and the Social Sciences Citation Index (ISI Web of Science) to identify the range of estimates and follow available source citations. Keywords for the search included *American Sign Language, ASL,* and *deaf,* alone or in combination with *demographics, people, population, signers,* and *users.* Not all of the terms functioned as indexed keywords in each database, but they were effective when used as text strings. Table 1 shows the correspondence among these terms.

Once estimates were identified, we also searched the Internet (Google) using certain phrases (e.g., "3rd most-used language") to determine the extent of particular claims and identify leads to different claims or estimates. When we could find no new estimates or prevalence claims about ASL use, we ceased our search for estimates and focused our efforts on sources. As is apparent in the discussion of our findings, the number of identified sources is small and leads to clear stopping points for the search.

TABLE 1. Search Term Correspondence among Internet Search Engines and Electronic Databases

Google	ERIC	PubMed (Medline)	PsycINFO	LexisNexis Academic Universe
American Sign Language	*American Sign Language*	*sign language*	*sign language*	American Sign Language
ASL	ASL	*ASL	ASL	ASL
deaf	*deafness*	*deafness*	*deafness*	deaf
demographics	*demography*	*demography*	*demography*	demographics
people	people	*persons*	*people*	*people*
population	*population*	*population*	population	population
signers	signers	signers	signers	signers
users	users	users	users	users

Notes: Terms in regular type are text strings used to locate websites or citations; italicized terms are database keywords used to index citations.
*Because of the prevalence of technical terms abbreviated as ASL, this text string was searched only in conjunction with other keywords.

Results

What's on the Web?

A search of the Internet for estimates of the size of the population of people who use ASL in the United States resulted in a number of "hits," some of which led directly to sites posting estimates, while others provided links that led to posted estimates. Selected to minimize the repetition of particular estimates and sources, table 2 presents a sample of the sites and estimates identified. Notice the wide variability among the claims, ranging from 100,000 to 15,000,000 (by Aetna); the latter claim is certainly equating significant hearing loss with sign language use.

In general, we found two major claims on the Internet: First, fewer than two million (and likely fewer than one-half million) people in the United States use ASL; second, ASL may be the third most-used language in the United States. These claims, however, are largely ahistorical. With the exception of a publication date associated with the source for the estimates, the numbers available from the Internet are presented as current and, to within any limits offered, accurate.

What's in the Recent Literature?

There is no recent research on the extent of ASL use in the United States. Instead, linguistics researchers have attended to variations among users of ASL (e.g., Lucas, Bayley, and Valli 2001) and the differences between ASL and systems of manual or signed communication (e.g., Schick 2003; Wilbur 2003). In addition, they have investigated the increasing popularity of ASL courses, especially at the college and university level (e.g., Welles 2004). However, neither demographers of languages nor demographers of deafness have examined the prevalence or distribution of ASL use in the U.S. population.

Nonetheless, recent articles in various peer-reviewed and professional publications, as well as a few books and monographs, have included some of the same estimates that are circulating on the Internet. Many of these print sources do not cite original research. Three examples illustrate the kinds of repetition and confusion present in the literature. First, take the case of Barnett (2001, 2002;

TABLE 2. Selected Internet Sources for Estimates of the Prevalence or Prevalence Ranking of ASL Use in the United States

Prevalence or Prevalence Ranking Estimate	Website where estimate was found
100,000–500,000	ERIC Digests (Wilcox and Peyton 1999) MSN Encarta (Wilcox 2004) Ethnologue.com (Ethnologue 2004)
250,000–500,000	American Sign Language Program at the University of Iowa (Department of Speech Pathology and Audiology 2004) ASLTA (NC ASLTA and NCAD Ad Hoc Committee 2004) Colorado Department of Human Services (Colorado Commission for the Deaf and Hard of Hearing, n.d.)
300,000–500,000	BarnesandNoble.com (Costello 1994) SignWriting.org (Rosenberg 1999)
500,000*	American Academy of Family Physicians (CDGAP 1997) ASLinfo.com (ASLinfo.com, n.d.) DEAF CAN! (Deaf Community Advocacy Network n.d.)
500,000–2,000,000	Brenda Schick (Schick 1998) DawnSignPress (DawnSignPress 2003) Gallaudet University Library (Harrington 2004)
15,000,000	Aetna InteliHealth (Gordon 2001)
Third most-used language	HandSpeak (HandSpeak.com n.d.) Health Literacy Consulting (Osborne 2003) Missouri Office of State Courts Administrator (Office of State Courts Administrator n.d.)
Fourth most-used language**	ASHA Leader Online (Scott and Lee 2003) Deaf Resource Library (Nakamura 2002) NIDCD (National Institute on Deafness and Other Communication Disorders 2000)
Third to tenth most-used language	Wikipedia (Wikimedia 2004)

*The sites listed here used the number 500,000 in similar but not identical ways, such as "approximately one-half million," "more than one-half million," or "more than 500,000."

**These sites include those that report that ASL is the third most-used non–English language.

Barnett and Franks 1999), who repeatedly cites Lotke (1995). Lotke, a physician, has not researched the prevalence of ASL use, nor did he cite any sources when he asserted that "American Sign Language is the third most used language in the United States after English and Spanish. . . . [N]o single Asian language is used as much as ASL" (ibid., 55). This is a case in which the repetition of a claim—that ASL is the third most-used language—has taken on the status of fact. In the following sections, we demonstrate that this fact status has two flaws: First, it is undoubtedly wrong, and second, it is time bound (i.e., the demographics of language use in the United States have changed since the 1970s, which is when the claim originated).

As a second example, consider Wilcox (1989, 2004; Wilcox and Peyton 1999; Wilcox and Wilcox 1997), who cites Padden (1987): "Although the precise number of ASL users is difficult to determine, ASL is the predominant language—in other words, the language used most frequently for face-to-face communication, learned either as a first or second language—of an estimated 100,000 to 500,000 Americans (Padden, 1987), including Deaf native signers, hearing children of Deaf parents, and adult Deaf signers who have learned ASL from other Deaf individuals" (Wilcox and Peyton 1999, 1). In this case, a leading deafness and language researcher, Carol Padden, is appropriately cited. However, Padden (1987) is not a primary source. This encyclopedia entry is a tertiary source, and its distance from the original sources thus obscures some important details.

A third example is the case of Lane, Hoffmeister, and Bahan (1996, 42), who cite Schein (1989) and Grosjean (1982) when asserting that "estimates range from 500,000 to two million speakers [of ASL] in the U.S. alone; . . . ASL is the leading minority language in the U.S. after the 'big four': Spanish, Italian, German, and French." Similar to the previous example, these claims are supported by references to two leading researchers. However, the references offered are not relevant to the claims they make: Grosjean (1982, 84–85) makes reference to the prevalence of deafness in the United States, without citation, while Schein (1989, 9) reiterates official U.S. deafness statistics from 1971 and mentions, without citation, that "the Deaf community came into being when there were fewer than 10,000 Deaf persons in the United States and . . . there are presently around

500,000'' (222). As we describe later, a closer examination of Schein's original work (Schein and Delk Jr. 1974) reveals that there may have been as many as 500,000 people who used ASL at home in the early 1970s, only about half of whom were deaf, however.

What's in the Past Literature?

Before considering the Schein and Delk Jr. (1974) NCDP report, we discuss the citations leading back to it. First, ignoring Schein's (1989) statement that lacks any reference to publications or data enumerating a sign-language-using population, the most recent source cited by any of the ''current'' publications and websites is the Padden (1987, 44) entry in the *Gallaudet Encyclopedia of Deaf People and Deafness:* ''No accurate census of users of ASL is available, but estimates of primary users vary from 100,000 to 500,000. Primary users include several groups of signers: native signers, who have learned ASL as a first language from deaf parents; fluent signers, from hearing families, who learned ASL from other deaf individuals; and hearing children of deaf parents, who have learned the language from childhood and continue to use it fluently with deaf people'' (the bibliography on p. 53 cites Baker and Cokely [1980]). Given that the U.S. Bureau of the Census emphasizes the importance of language use *at home,* as opposed to at school, work, or elsewhere, Padden's emphasis on primary users fits fairly well with what might otherwise be reported in the decennial census. At the same time, however, we do not have a comprehensive review of the literature accompanying this entry; we have Baker and Cokely (1980).

Baker and Cokely (ibid., 47) present a short summary of the research they were able to identify and their sources, but not a thorough review: ''American Sign Language (also called ASL or Ameslan) is a visual gestural language created by Deaf people and used by approximately 250,000–500,000 Americans (and some Canadians) of all ages.'' Their footnote cites O'Rourke (1975) and Woodward (1978). The more recent work they cite—that by Woodward (ibid.)—is a critique of the O'Rourke (1975) report, which states the following: ''Just fewer than 500,000 deaf persons use sign language (this figure does not take into account the number of people with normal hearing who have learned sign language. The total is actually double or

triple that number). . . . Users of Spanish in the United States number 4½ million; 631,000 speak Italian. The third 'other' language is sign language'' (27).

The source cited for these claims is ''research connected with proposed federal legislation to include deaf persons in the Bilingual Courts Act'' (discussed in the next section). For now, consider Woodward's (1978, 188) response: ''We could more safely estimate our *native* users of ASL at around 250,000. . . . There are nine languages with more than 500,000 *native* users in the U.S. and eighteen languages with more than 250,000 *native* users. ASL rates considerably lower than third as frequently used foreign language in the U.S.'' (emphasis in the original). We now understand why Baker and Cokely provide prevalence estimates that differ by a factor of two, as well as why they do not attempt to rank its use relative to other languages spoken in the United States. Woodward and O'Rourke have some serious differences.

Woodward's comments also remind us that discussion of ASL use tends to be imprecise. ASL use needs to be carefully defined and measured. Otherwise, it is inappropriate to make claims about its prevalence in the United States because available language-use statistics may not be comparable. In particular, if we were to utilize the estimates from the U.S. Bureau of the Census as our basis for comparison in establishing the prevalence ranking of ASL use, which is what Woodward did (see U.S. Bureau of the Census 1973, table 19, 492), we would have to define ASL use as an *at-home* language-use behavior of both native-born and foreign-born people regardless of hearing status (careful examination of the entire text of Woodward's analysis reveals that he does not adopt this definition). With the exception of Padden (1987) and those who cite her, serious efforts at definitional precision are not observed among those discussing ASL use in the United States.

The Woodward (1978) and O'Rourke (1975) publications identify the endpoints of the literature search. There are two sources to which nearly all current claims owe their genesis: Schein and Delk Jr. (1974) and Jane Beale's (1974) statement presented to the U.S. Senate hearings held by the Subcommittee on Improvements in Judicial Machinery in connection with the Bilingual Courts Act (S. 1724), which addressed the need for sign language interpreters in

U.S. federal courtrooms. Since the research leading to the Schein and Delk volume preceded the testimony by Beale, we examine her printed statement first.

The Bilingual Courts Act

The Senate hearings record indicates that Beale consulted a number of documents and experts in preparing her statement on behalf of the Registry of Interpreters for the Deaf, a presentation that covered more than statistics on the demography of deafness and languages. Here is Beale's (1974) summary of the demography of deafness projects at that time: "Preliminary statistics from the National Census of the Deaf and the National Center for Health Statistics . . . reveal that the deaf population has been underestimated during the past 40 years (the last census of the deaf was in 1930). Approximately 13.2 million Americans have a measurable hearing loss, and of those with a hearing loss, 6.5 million have a bilateral loss. A large portion of these people has become hard of hearing or deaf due to aging. Approximately 2 million people in the United States cannot understand normal speech, and of this number, just under 500,000 comprise the deaf community (deaf people who use sign language)" (94). These numbers correspond in general with those reported by Schein and Delk Jr. (1974), but their interpretation is inaccurate.

Turning to the demography of language-use research that Beale referenced, we learn that the discussion of U.S. language census statistics cited inadvertently creates even more confusion than the demography of deafness review: "Census statistics on languages spoken in the home, published in 'Characteristics of Population by Ethnic Origin,' indicate that 4.5 million Americans speak Spanish; 631,000 speak Italian; 414,000 speak French; 251,000 speak German; and 126,000 speak Yiddish. Thus, the number of deaf persons using sign language (approximately 500,000) compares with the number of persons speaking Italian and French, which rank second and third of the six major foreign languages spoken in American homes" (95). The document Beale referenced is a supplemental, intercensal survey (November 1969 CPS; see U.S. Bureau of the Census 1971). It provides not only the kind of estimates found in standard language census reports but also some special estimates related to then current non–English language use. The latter are less typical analyses, but

they are precisely the estimates Beale reported, which leads to serious confusion.

It appears that Beale is attempting to use estimates about persistent non–English language use (her bibliography cites the U.S. Bureau of the Census 1971, table 7), rather than those sources that would be more consistent with Woodward's discussion (e.g., those found in the U.S. Bureau of the Census 1971, table 6, p. 10, which is comparable to the U.S. Bureau of the Census 1973, table 19, p. 492). These less typical analyses separate people who were using a non–English language in the home from those who reported a non–English language as their "mother tongue" but were using only English in the home. This distinction was of vital importance to the Senate hearings because a bilingual court interpreter would most clearly be needed for those people for whom English was *not* the language they currently spoke.

However, this distinction between those who know and use a non–English language and those who know and use *only* a non–English language misleads the reader about the prevalence of non–English language use in U.S. homes. At the time of the Senate hearings, six non–English languages (Spanish, German, Italian, Polish, Yiddish, and French) were each spoken by more than one million people who were either foreign born or children of foreign-born parents, and another four (Swedish, Norwegian, Slovak, and Greek) were each spoken by more than 400,000 foreign-born people or children-of-foreign-born people (ibid.). Even if the number of deaf people for whom an ASL interpreter would need to be present in order to ensure equal access to federal legal proceedings approached 500,000 (see next section for a more justifiable estimate), ASL was not one of the top three or four languages used among the larger segment of the population that spoke a non–English language at home and, likely, English as well. This confusion about the definition of the reference group used for prevalence ranking, those who speak *only* a non–English language—and who may require a bilingual court interpreter—versus those who speak both English and a non–English language appears to be the reason that Beale's statement to the Senate committee has been a source of confusion ever since it was presented.

The Ultimate Source

The Schein and Delk Jr. (1974) NCDP report remains the ultimate source for data-based estimates of the number of people who use ASL in the United States. Certainly, no one has directly studied this issue since then. At the same time, we have to keep in mind that this was a national study of deafness in the U.S. population and not a study of signed language use in the general population. No one has ever undertaken a study of American Sign Language use in the general population.

Schein and Delk Jr. state that "the majority of the prevocationally deaf population regards its manual communication skills highly" (ibid., 62; prevocationally deaf people are those who were born deaf or experienced a hearing loss before age 19). This claim is derived from a 1972 survey sample drawn from the NCDP registry. About two-thirds of the nearly fifteen hundred survey respondents, ages 25–64 years, rated their expressive and receptive signing skills as "good"—the highest rating possible (see table 4.9, p. 63). The specific questions eliciting these responses were "How good is your signing?" and "How about reading signs?" (see appendix E, form B, questions B-81, B-83, and B-84, p. 256). A list of possible responses was presented to each person participating in the survey: "good," "fair," "poor," or "not at all." There was no specific mention of American Sign Language (or ASL or Ameslan or sign). Indeed, the widespread use of the term "American Sign Language" (or its abbreviation, ASL) was just beginning. This survey's results cannot be taken as a definitive estimate of the number of deaf people using ASL but rather more generically represent those who said they communicated manually.

Nonetheless, the fact that this NCDP follow-up survey was conducted in 1972 with adult respondents at least twenty-five years of age means that the probability that these prevocationally deaf adults had any noteworthy exposure to a specific system of signed English in the timeframe during which they would have developed their signing fluency level is considerably lower than at any time since. In other words, the collection of dialects and discourse registers employed by "good" signers was more likely to be recognized as communal sign

languages than artificial sign systems. This does not mean, however, that the proportion of ASL users was known.

So, keeping in mind that *signing does not necessarily equal ASL use,* how many of these people rated themselves as good signers? According to Schein and Delk Jr. (1974), the total prevocationally deaf population—civilian, noninstitutionalized people of all ages—was estimated to be 410,522 in 1971 (see table 2.10, p. 28), which is less than 500,000. Based upon Mitchell's (2004a) analysis of Schein and Delk Jr. (1974), we estimate that there would have been about 277,000 good signers who were prevocationally deaf. This contrasts significantly with Beale's one-half million but is comparable to Woodward's estimate of one-quarter million.

There is still a problem of statistical comparability. Language census data collection pertains to all household members regardless of hearing status. Here, Padden's (1987) definition of primary users, which includes hearing children of deaf adults (CODAs), puts us on the path for obtaining an ASL-using population estimate. Employing rates for fertility and offspring hearing status (see Schein and Delk Jr. 1974, table 3.8, p. 44; table 3.9, p. 45, and table 4.9, p. 63), we estimate an upper limit of 101,000 CODAs who may have signed at home and were still in the home with their deaf parents (based upon the likely number of hearing children born to prevocationally deaf mothers under age fifty who were "good" signers). This must be seen as an upper limit because there is evidence that some signing deaf parents nonetheless only speak to their hearing children (Stuckless and Birch 1966; Harris 1978).

A group of people who may use ASL at home and who may have been overlooked by Padden (1987) and Mitchell (2004a) are the hearing spouses of deaf adults. We estimate the size of this group by multiplying the proportion of marriages between deaf and hearing adults with the number of prevocationally deaf adults who sign well by gender (for spouse's hearing status, see Schein and Delk Jr. 1974, table 3.7, p. 43) at nearly 30,000. Adding this to the number of CODAs, we revise our estimate of hearing people likely to be signing at home upward to 131,000. Combining the deaf and hearing totals, our best estimate from the NCDP is that there would have been no more than 408,000 people who were "good" signers in the home in

1972. Again, this must be seen as an upper limit, but, in this case, we have no evidence either way about whether signing deaf adults continue to sign at home when establishing a family with a hearing spouse.

Beyond what we can infer from the NCDP, we must consider the possibility that there were hearing parents or hearing siblings of deaf children who used ASL or otherwise signed at home. The Annual Survey at the time of the NCDP, unlike recent Annual Surveys (e.g., see Mitchell and Karchmer 2005), did not provide information on whether any family members signed with a deaf child at home. We do know that some parents, particularly mothers, may learn to sign with their deaf child (Meadow-Orlans, Mertens, and Sass-Lehrer 2003), but we have no basis for estimating how many had learned to do so (or the nature of their signing) in 1972.

Likewise, we know that hearing siblings may learn to sign with their deaf siblings in a home with hearing parents (ibid.), but we do not know the extent of this behavior, either. However, if we assume that regular signing at home averaged one hearing member per family with a deaf child but no deaf adults (about 95 percent of families with a deaf child have no deaf parents; see Mitchell and Karchmer 2004a), which is an arbitrary number, we would estimate that an additional 90,000 people may have signed at home. In other words, we may wish to inflate the previous estimate to not more than 500,000 people who were signing at home in 1972. Certainly, the number of those who used ASL at home would have to be fewer than (or at best equal to) the total number who signed at home.[1]

Discussion

There is no question that it is important to know the number of people who use ASL in the United States, but some of the estimates and characterizations in current circulation should be taken with a grain of salt. As our review of the literature demonstrates, at least two errors have led to confusion: (1) The demography of deafness statistics have been inappropriately used to estimate the number of people, particularly deaf people, who use ASL; and (2) the earliest claim about the prevalence ranking of ASL use among all languages used in the United States, which itself conflated deafness with sign use, was

not a claim for total prevalence among all those who use a non–English language at home but was restricted to those who use *only* a non–English language at home.

There is good reason to believe that the number of deaf ASL users in 1972 was high enough for them to clearly merit equal access in the federal courts via a bilingual court interpreter (though the right itself is an individual right and not one extended only to groups). However, this group was probably about half the size that Beale mentioned (1974) in her prepared statement for the Bilingual Courts Act. We cannot provide a revised prevalence ranking given the limited number of languages listed in Beale's original reference, but we are confident that ASL-only users would easily have outnumbered many other groups who exclusively used a non–English language in 1972.

We should keep in mind that Schein and Delk Jr. (1974) obtained their sign language use data by taking a modest-sized sample from a registry that may (or may not) have been biased so as to overidentify people who signed. That is, sign language use data were not part of the full census taken the previous year but were obtained from a postcensus survey of fewer than fifteen hundred respondents. Beyond our uncertainty about biases in the registry and statistical uncertainty resulting from limited sample size, however, the methodology was appropriate and well executed. The NCDP is the best and only source available for making an estimate of sign use in the United States at any period in the country's history.

Given the insights gained from tracking down these sources, we can account for most of the numbers in current circulation. First, we emphasize that estimates of the population of deaf people in excess of one-half million are sure to be dominated by those who lost their hearing as adults, typically after age sixty-five. Most of these late-deafened adults are highly unlikely to use ASL at home. As a consequence, we can discount these overly large population estimates as the mistaken or unexamined conflation of people with significant hearing loss with those who use ASL.

Second, most of the citations of ASL as the third or fourth most-used language in the United States seem based at least indirectly upon the repeated misunderstanding of Beale's (1974) prepared statement. It requires a very close reading of Beale's remarks to understand that

she was referring to the subset of people who *require an interpreter* for access to English-language courtroom proceedings because they use a language other than English. Thus it would be easy to mistakenly infer that ASL is the fourth most-used language in general because it was identified by Beale as the third most-used language other than English among monolingual persons in the United States. And if a reader did not grasp that ASL ranked third in a list of non–English languages, then we would expect claims that ASL is the third most-used language to show up. Indeed, both of these claims are found in the literature, though neither is correct.

The only estimate in the literature that escapes easy explanation is Padden's (1987) lower-bound estimate of 100,000 primary users of ASL. We have found neither any reference to this lower number nor an explanation for why it was offered. We suspect that this conservative approximation may be associated with the number of prelingually deaf people, many but not all of whom are likely to be signers. Schein and Delk Jr. (1974, table 2.1, p. 16) estimated that there were 201,626 such people in 1971. Regardless, we have not been able to identify any source that has preferred to cite the 100,000 estimate as the likely size of the population or to make claims about the prevalence ranking of ASL use that would be based upon this number.

What Next? A Call to Action

The most important finding of this literature review is that the need for an accurate estimate of the number of people who use ASL in the United States still exists. This need is magnified by the profound changes in the demographics of the U.S. population at large. Between 1970 and 2000 the total population grew by 38 percent (see Gibson and Jung 2002; U.S. Bureau of the Census 2002b). More importantly, the increased rate of non–European immigration has changed the face of the country. The proportion of non–Hispanic white persons has dropped from 83 percent to 69 percent (see Gibson and Jung 2002; U.S. Bureau of the Census 2002b), and the ten most commonly spoken non–English languages in U.S. homes, after Spanish, are now Chinese, French, German, Tagalog, Vietnamese, Italian, Korean, Russian, Polish, and Arabic, rather than the solely European list of German, Italian, French, Polish, Gypsy (Romany), Swedish,

Norwegian, Slovak, Greek, and Czech (Shin and Bruno 2003; U.S. Bureau of the Census 1973). With this much change, an approximation based upon the prevalence of signing among prevocationally deaf people and their families in 1972 cannot be used to project the size of the signing population in 2005, let alone the number people who use ASL in the United States. We propose three strategies for rectifying this problem.

First, in principle, more recent estimates of ASL use at home in the United States could have been derived from the decennial census. However, given the current phrasing of the question on non–English home language use, "Does this person speak a language other than English at home?" (Shin and Bruno 2003, 1, part a), we are convinced that ASL use would have been underreported. That is, ASL is not a spoken language, so people might not report ASL as a language other than English because it is *signed* in the home. In any case, the issue is moot since the U.S. Bureau of the Census practice is to code ASL as English when it appears on its forms. An analysis of ASL use is therefore not possible.

We maintain that the U.S. Bureau of the Census should change its language census data-coding practices in order to preserve the affirmative responses received for signed language or ASL use at home. Moreover, if possible, the bureau should work to improve the likelihood that signed languages are recognized as appropriate responses for non–English languages used at home. To accomplish these ends, we propose two steps to be implemented immediately:

1. Reword the question on non–English home language use to eliminate any possible inhibition to providing ASL or another signed language as a response; this may be as simple as substituting the word "use" for "speak." Even better would be to add "American Sign Language" as one of the sample languages listed in the question (Shin and Bruno 2003, 1, part b).
2. In the initial data-coding phase, code all ASL or signed language responses for what they are; do not code them as English.

With these small changes in practice, the decennial census could easily become a data source for estimating the number of people who use ASL at home. Further, if the sensory disability question remains

a part of the decennial census, it would be possible to estimate how many of these ASL users are also deaf.

A second possible way to utilize existing, high-quality, federally sponsored national surveys is to add a question to the NHS, in particular, its annual National Health Interview Survey (NHIS). That is, with appropriate investment in survey item development and a very small change in the overall design of the survey instrument, the NHIS could include a direct question to each respondent about whether ASL or any other non–English language is used in the home regardless of the respondent's hearing status or difficulty with conversation. Even if the response rate is low for ASL use, making the estimate from any given year relatively unreliable, the current NHIS design permits the stacking of multiple years of data, which would improve the reliability of the estimates. Given the importance of access to health care for deaf people who sign, as well as others who do not speak English, and the need to know that informed consent has been obtained legitimately, including a question about ASL and other non–English language use on the NHIS would provide information relevant to improving the nation's health services, as well as supplying missing demographic information.

The third and most expensive way to obtain a good estimate of the number of ASL users in the United States would be to undertake an independent study designed to address this question directly. However, because a tremendous amount of talent and resources goes into maintaining the extensive capacities of the U.S. Bureau of the Census, which does the fieldwork for the NHIS, it would make sense to do an independent survey only if it includes a kind of inquiry that requires the skills of an independent group of researchers. For example, given the complexity of identifying those who use ASL (as opposed to some other form of manual communication), if claims about ASL use are to be independently verified, then the staff and field agents of the U.S. Bureau of the Census would be unable to easily conduct such an investigation; an independent team would have to be formed. However, if "the names used by speakers [*sic*] of a language to identify it may reflect ethnic, geographic, or political affiliations and do not necessarily respect linguistic distinctions" (U.S. Bureau of the Census 2004, B-31), then the need to fund a separate study arises only if the first two strategies fail.

Conclusion

It appears that misunderstandings and misrepresentations of what is known about the demography of deafness and ASL use in the Unites States are widespread. Though the tendency for advocates to overstate when citing statistics may have played some role, we suspect that the perpetuation of inordinate claims can as easily be attributed to three simple problems. First, many writers have not exercised due care and precision in identifying their population of interest, let alone having data that correspond to their presumed target group. Second, once claims appear in writing, especially official government documents, these statements tend to take on the status of fact. Third, there has been a persistent need for statistics on ASL use even though there has *never* been a true study of ASL use in the general U.S. population; writers are compelled to come up with something even though no statistics exist.

In sum, Schein and Delk Jr. (1974) provided evidence that as many as 500,000 people, regardless of hearing status, may have been signing at home in 1972; certainly, their estimate suggests that there were more than 250,000 prevocationally deaf people who were good signers. In the remaining literature reviewed, all of the population estimates greater than 500,000 appear to have resulted from conflating deafness with ASL use and to be based on demography of deafness estimates. In order to pursue an approximation of the number of people who use ASL in the United States we have proposed three different strategies: (1) Make a few small but significant changes in U.S. census practice so that ASL use can be recorded; (2) include in the NHIS a specific inquiry about non–English language use that includes ASL as a legitimate response for all respondents; or (3) undertake a far more resource-intensive independent survey of ASL use in the United States. By realizing that the conflation of ASL signing and deafness is wrong and misleading, we understand that a new and unified approach to the demography of language and deafness is required and that relatively minor changes in current practices are necessary to obtain data that will help to answer the question, ''How many people use ASL in the United States?''

Note

1. If we were to exclude only the people with pre-vocational deafness who responded to ''How good is your signing?'' and ''How about reading

signs?'' with ''Not at all'' (i.e., ''Good,'' ''Fair,'' and ''Poor'' all constitute acceptable responses from those for whom ASL would have been the primary language used in the home), then our estimate of the number of persons who were signing at home in 1972 would be no greater than 642,000, with 375,000 of these people being pre-vocationally deaf themselves. The result from this more inclusive calculation very nearly splits the difference between the Woodward and Beale estimates, but introduces greater uncertainty about whether to believe that these pre-vocationally deaf people were primarily using ASL, let alone using it as the primary means of communication with all household members.

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