

BRENDA NICODEMUS, LAURIE SWABEY,
LORRAINE LEESON, JEMINA NAPIER,
GIULIA PETITTA, AND MARTY M. TAYLOR

A Cross-Linguistic Analysis of Fingerspelling Production by Sign Language Interpreters

Abstract

Little is known about the nature of fingerspelling during sign language interpretation. In this small-scale, exploratory study, we examined the fingerspelling of interpreters working in five different sign languages: American Sign Language (ASL), Australian Sign Language (Auslan), British Sign Language (BSL), Irish Sign Language (ISL), and Italian Sign Language (LIS). Sixteen interpreters were video-recorded as they rendered President Barack Obama's 2009 inaugural address in their country's sign language. After completing their interpretations, the participants engaged in a retrospective interview about their work. The data were analyzed both quantitatively (for

Brenda Nicodemus is associate professor in the Department of Interpretation and Translation at Gallaudet University and director of the Gallaudet Center for the Advancement of Interpreting and Translation Research (CAITR). Laurie Swabey is professor in the Department of ASL and Interpreting at St. Catherine University in St. Paul, Minnesota and the director of the CATIE Center. Lorraine Leeson is professor of Deaf studies, director of the Centre for Deaf Studies, and director of research at the School of Linguistic, Speech and Communication Sciences, Trinity College Dublin, Ireland. Jemina Napier is professor and chair of Intercultural Communication in the Department of Languages & Intercultural Studies at Heriot-Watt University, Edinburgh, Scotland, where she is also the head of the department. Giulia Petitta is a visiting scholar in the Department of Interpretation and Translation at Gallaudet University. Marty M. Taylor is an independent researcher, educator, and consultant who also publishes instructional materials through her company, Interpreting Consolidated, in Edmonton, Alberta, Canada.

frequency and type of fingerspelling) and qualitatively (for factors influencing fingerspelling). Results indicate that the most fingerspelled items ($n = 137$) were produced in the ASL interpretations and the fewest ($n = 18$) were produced in the LIS interpretations; variation between the groups was found in lexicalized fingerspelling and the fingerspelling of place names. We suggest that the variation in fingerspelling both within and between groups may be explained by sociolinguistic factors, including interpreters' language attitudes and perceptions of the deaf audience. This exploratory study provides a first step in investigating the fingerspelling of interpreters in a variety of sign languages.

WHAT DO THE following words have in common: *wealth*, *Afghanistan*, *oath*, *do*, *innocent*, *care*, and *Gettysburg*? The answer may not be immediately transparent, but this motley collection of nouns, adjectives, and verbs appeared in President Barack Obama's 2009 inaugural address. Notably, each of these words was fingerspelled by at least one interpreter while rendering the speech in sign language. Fingerspelling is a linguistic feature of sign languages in which letters from spoken-language alphabets are represented by conventionalized handshapes (Sandler and Lillo-Martin 2006). One of its functions is to increase the vocabulary size of a sign language by borrowing words from the ambient spoken language. In recent decades, the phonological and morphological structures of fingerspelling in various sign languages have been documented (Battison 1978; Schembri and Johnston 2007; Sutton-Spence 1998; Vasishta, Woodward, and de Santis 1981; Wilcox 1992), but few studies have compared fingerspelling in diverse sign languages. The lack of cross-linguistic analysis may be due to variation among datasets (different topics, contexts, and signers), which makes meaningful comparison difficult. However, issues of variation are at least partly mitigated when comparing sign language interpretations that were rendered from a single source text. Using this approach controls for topic, register, and context, which facilitates cross-linguistic analysis. To our knowledge this is the first study to examine fingerspelling across different sign language interpretations.

Of the 138¹ sign languages that have been cataloged to date, approximately forty have been documented as having fingerspelling systems (Zaitseva 2004). Two families of manual alphabets (employing

one or two hands) are used to represent the Latin alphabet. The more frequent type of manual alphabet is produced primarily by one hand. For example, American Sign Language (ASL) and Italian Sign Language (LIS) use a one-handed alphabet in which each fingerspelled letter has a unique combination of handshape, orientation, and, in a few cases, path movement (Battison 1978; Wilcox 1992).

In two-handed fingerspelling systems, letters are formed by both the dominant hand and the subordinate hand (Sutton-Spence 1998). Two-handed fingerspelling is used by signers of British Sign Language (BSL), Australian Sign Language (Auslan), and New Zealand Sign Language (NZSL), collectively referred to as BANZSL (Johnston 2003). The languages of BANZSL are considered dialects of one another due to their similar grammatical structures, manual alphabet, and the high degree of lexical overlap. Fingerspelled letters in BANZSL are specified for handshape, orientation, location, and, in two cases, movement. Vowels are represented by pointing to specific fingertips. Whether one handed or two handed, fingerspelling occurs sequentially, meaning that an individual letter is produced and is followed by the next letter, and so forth.²

Lexical items, including fingerspelled items, vary in frequency among sign languages (Padden 1998; Schembri and Johnston 2007). Lexical frequency has been examined in several large-scale studies of various sign languages (Fenlon, Schembri, Rentelis, Vinson, and Cormier 2014; Johnston 2012; McKee and Kennedy 2006; Morford and MacFarlane 2003). These frequency studies were based on a large number of tokens, a cross-section of the sign language community, and communicative contexts ranging from spontaneous conversations to formal speeches.

In 2003 Padden and Clark Gunsauls studied the characteristics of ASL fingerspelling in discourse. Using video recordings of fourteen native signers from different regions of the United States, they identified a total of 2,164 fingerspelled items by coding ten minutes of continuous conversation by each of the signers, who varied in age, gender, educational background, and occupation. Results indicated that 12–35 percent of ASL discourse is fingerspelling, regardless of signers' gender, age, class, and ethnicity. Notably, the authors reported that signers in other languages often note the preponderance of fin-

gerspelling in ASL, an observation that is still made today, but without being supported by evidence.

In another study of the impact of sociolinguistic variation on fingerspelling, Schembri and Johnston (2007) found that Auslan signers who were at least 51 years of age made more frequent use of fingerspelling than did those who were 50 or younger. Schembri (2001) speculated this reflects the fact that the older signers were educated at schools in which teachers exclusively used fingerspelling. Schembri and Johnston (2007) also noted that the word “do” was one of the most frequently fingerspelled items in Auslan, where it was fingerspelled as a lexicalized English verb. Lexicalized fingerspelling (sometimes referred to as fingerspelled loan signs) incorporates signs that are based on fully fingerspelled words but that have been restructured to more closely fit the phonology of the sign language lexicon (Battison 1978; Cormier, Schembri, and Tyrone 2008; Valli and Lucas 2002). In transcription, fingerspelled items that have been lexicalized as signs are represented by the # symbol in front of a particular word (e.g., #DO).

A corpus study of 19,450 fingerspelled items collected from 485 interviews with BSL signers reported the use of fingerspelling as related to three social factors: gender, region, and age (Sutton-Spence, Woll, and Allsop 1990). No effects due to gender were found, but region and age were significant factors in variation among signers. A further study of a dataset collected by Sutton-Spence (1998) revealed that the BSL signers used very few fingerspelled items. The highest numbers were for abbreviated whole words (e.g., S-E-P-T for September), followed by whole function words (e.g., B-U-T), whole content words (e.g., s-H-O-P), and whole proper names (e.g., O-X-F-O-R-D). Sociolinguistic variation in fingerspelling has also been found to result from gender differences. An analysis of ISL reveals that male signers of all ages make greater use of fingerspelling (Fitzgerald 2014). Further findings suggest that older deaf men utilize fingerspelling much more often than any other cohort of Irish deaf people (Leeson 2005).

To date, fingerspelling in LIS has not been investigated in great depth, perhaps because it is considered to be primarily a form of communication used in deaf education rather than a true feature of sign languages (Beronesi, Massoni, and Ossella 1991; Volterra 1987).

Typically, LIS signers use productive signs rather than fingerspelling; however, lexicalized signs are present in the LIS vocabulary (e.g., the days of the week, as well as the name of LIS³ itself) (Radutzky 1992; Volterra 1987). In general, fingerspelling in LIS is limited to dedicated, special purposes, such as to introduce a new word or sign, to define a concept when a conventionalized sign is not available, to request the translation of a word, or to reference words in written language (Petitta 2015).

Studies have indicated that the frequency of fingerspelling among deaf signers is also influenced by language contexts (Adam 2012; Battison 1978; Mulrooney 2002; Schembri and Johnston 2007; Stratiy 2005; Sutton-Spence 1998). For example, differences have been found between casual and formal signing contexts (Schembri and Johnston 2007) and when conveying foreign words and proper nouns (Padden and Clark Gunsauls 2003; Volterra 1987).

How do sign language interpreters use fingerspelling? One study has found that they use fingerspelling in interpreter-mediated discourse as much as deaf signers do in direct discourse (Napier and Adam 2002). Sign language interpreters have been shown to fingerspell technical terms and scientific vocabulary in academic settings (Leeson 2005; Leeson and Foley-Cave 2007; Napier 2006; Petitta 2015). In some interactions, after the first use of fingerspelling, interpreters then produce the first letter of the corresponding word with a particular movement (usually circular) and mouth the word at the same time (Sutton-Spence 2006). This process—known as the initialization of words—has been linked to time constraints, especially in TV news settings (Kellett Bidoli and Sala 2011). Fingerspelling is also used as a default strategy when interpreters are unfamiliar with a particular sign, an approach that may not always be effective for deaf people (Leeson 2005; Nicodemus and Emmorey 2013; Swabey, Nicodemus, Taylor, and Gile 2016). Moreover, second-language learners of ASL may not be fluent enough to recognize the sociolinguistic range of variation that leads to differences in the use of fingerspelling and may not have the linguistic flexibility to adjust their own use of language to that of their target audience (Stratiy 2005).

In our small-scale, exploratory study, we video-recorded sixteen interpreters rendering a single source message into different sign

languages. Using President Obama's 2009 inaugural address as the source text, we analyzed the use of fingerspelling in interpretations rendered in ASL, Auslan, BSL, ISL, and LIS. By examining multiple interpretations produced from a single source text, we were able to compare fingerspelling production both within and between sign languages.

Our study was driven by the following overarching research question: What variation, if any, occurs in fingerspelling production in the interpretations of a formal speech rendered in various sign languages? From this guiding question, we developed a set of subquestions:

1. What is the frequency of *fingerspelling sequences* in various sign language interpretations?
2. What is the frequency of *lexicalized fingerspelling* in diverse sign language interpretations?
3. Are *place names* universally fingerspelled by sign language interpreters?
4. How *accurate* is the spelling of fingerspelled place names by sign language interpreters?

Regarding frequency, we hypothesized that the ASL interpretations would yield the highest number of fingerspelling sequences and lexicalized fingerspelling. This was based on earlier studies showing more fingerspelling produced by deaf ASL signers than by deaf signers in other languages. Alternatively, we postulated that the BanzSL, ISL, or LIS interpreters would produce at least as much fingerspelling as the ASL interpreters, suggesting that interpreters' fingerspelling does not align with the deaf signers. Regarding place names, we hypothesized that the interpreters would fingerspell place names fairly consistently across the sign languages as a means of providing specific content details in the source text. However, the results may indicate that interpreters do not universally produce place names, suggesting that interpreters are affected by familiarity with the reference, attitudes about fingerspelling, or other factors.

We also considered the sociolinguistic factors influencing interpreters' use of fingerspelling. Successful interpretation represents mastery not only of linguistic features but also of numerous aspects of communication in general, such as the role and power of the interlocutors, the setting, and the interpreters' perceptions of the interlocutors (Grbić

and Pöllabauer 2006; Metzger 1999). We examine excerpts from the retrospective interview data regarding possible sociolinguistic factors that influence interpreters' decisions with regard to fingerspelling.

Methods

As mentioned earlier, in this exploratory study we examined fingerspelling production in interpretations of President Barack Obama's 2009 inaugural address in several different sign languages. Viewed on a global scale, Obama's address created a rare opportunity for researchers in that audio- and video-recorded interpretations of the same source text became available in numerous spoken languages. Deaf people accessed the address as well, as evidenced by interpretations available on YouTube and other video-sharing websites. The present study was an extension of two previous investigations: a cross-linguistic analysis of spoken-language interpretations of Obama's address (Gile 2011) and a study of lexical items in interpretations rendered in three spoken languages (French, German, Japanese) and one sign language (ASL) (Swabey et al. 2016).

Participants

We examined the fingerspelling production of sign language interpreters who worked between four language pairs (or language groups, as with BANZSL): ASL-English, BANZSL-English, ISL-English, and LIS-English. Four interpreters participated in each language group for a total of sixteen interpretations (see table 1 for background information of the participants). We emphasize here that three of the groups (ASL, BANZSL, and ISL) have English as their working spoken languages, while the LIS interpreters have Italian as their working spoken language; however, the LIS interpreters in this study had varying degrees of fluency in English. In addition, with regard to the references made in President Obama's speech, the ASL interpreters probably had the greatest historical and cultural knowledge, which may have influenced their fingerspelling production.

Materials

As already mentioned, the source text for the interpreters was President Barack Obama's first inaugural speech, delivered on January 20, 2009.⁴ A commercially produced video of the speech was shown

TABLE 1. Background Information on Participants

Language	Years of Professional Experience	Age Range	Country of Origin	Native Language	Passed Test or Obtained Certification	Gender
ASL	7–26	27–49	United States	4 English	yes	3F/1M
BANZSL	17–24	34–49	2 Australia 2 United Kingdom	3 English 1 BSL	yes	2F/2M
ISL	8–20	30s–mid-40s	Ireland	4 English	yes	2F/2M
LIS	4–10	32–55	Italy	4 Italian	yes	3F/1M

on a laptop computer as the interpreters rendered the address. A video camera was used to record the participants’ interpretation of the address.

Procedures

When recruiting for the study, we informed the interpreters that they would be simultaneously interpreting an eighteen-minute speech from spoken English into their countries’ respective sign languages. When the participants arrived at the testing site, we revealed that the source material was Barack Obama’s inaugural address. After signing consent forms, each participant was given a verbatim written script of Obama’s speech in English and twenty minutes to prepare for the interpretation. The participants were instructed to prepare in the same manner as they would for a high-profile speech being broadcast on television. The participants were provided with a dictionary,⁵ blank paper, and a pen. They were told that they could make notes, which they could use as a resource during their interpretation if they wished. By setting these conditions, we attempted to replicate the conditions under which spoken language interpreters rendered the actual address, including a preparation time of twenty minutes and an absence of access to the Internet (Daniel Gile, pers. comm.). (For a study of the preparation by the ASL–English interpreters, see Nicodemus, Swabey, and Taylor 2014.)

At the conclusion of the preparation period, the participants were instructed to render their interpretation while standing. A laptop with

the video of Obama's address was positioned so the participants could see it as they interpreted if they wished. The participants were video-recorded as they interpreted the address, without pausing the recording. Upon completion, each interpreter participated in a retrospective interview, in which they viewed the video recording of their interpretation. They were asked to comment on challenges in rendering the speech and the strategies they employed. For uniformity, we followed a preestablished interview protocol when conducting the interviews.

Data Analysis

The video recordings of the interpretations and interviews were transcribed into written English and coded either by us, hearing student assistants who were fluent in sign language, a deaf researcher, or a combination of these individuals. We separately reviewed the digital videos, transcripts, and coding for accuracy. Fingerspelling was identified and coded in two ways: fingerspelling sequences (e.g., M-A-R-K-E-T, H-I-N-D-U) and lexicalized fingerspelling (e.g., #ALL, #DO). For fingerspelling sequences, we focused our analysis on the fingerspelling of place names, which were categorized as being fully fingerspelled (e.g., G-E-T-T-Y-S-B-U-R-G), partially fingerspelled (e.g., G-E-T-Y-S-B-G), or initialized fingerspelling (e.g., G). For lexicalized fingerspelling, we coded fully fingerspelled words that had been restructured to reflect the phonology of native sign language lexicon.

Results

Here we provide the results of the interpreters' fingerspelling for frequency of fingerspelled sequences, lexicalized fingerspelling, fingerspelling of place names, and accuracy of fingerspelled place names.

Frequency of Fingerspelled Sequences in Sign Language Interpretations

The lowest total number of fingerspelling sequences occurred in the LIS interpretations (18 tokens) and occurred only when fingerspelling proper nouns. The highest number occurred in the ASL interpretations (137 tokens), nearly seven times the number of tokens used by the LIS interpreters. In comparison, the ISL interpreters produced a total of 96 fingerspelled sequences, the second highest number. Finally,

TABLE 2. Frequency of Fingerspelled Sequences per Interpreter (INT) by Language

Language	INT 1	INT 2	INT 3	INT 4	Total
LIS	4	4	5	5	18
BANZSL	26	15	3	9	53
ISL	11	12	47	26	96
ASL	15	21	40	61	137

the BANZSL interpreters produced 53 fingerspelled sequences, less than half the number of fingerspelled items used by the ASL interpreters (table 2).

As table 2 illustrates, the number of fingerspelled sequences produced by individual participants varied among the BANZSL, ISL, and ASL interpreters. For example, in the ASL interpretations, the number of tokens ranged from 15 (produced by INT 1) to 61 (produced by INT 4). For ISL, the range was similar, with a low of 11 tokens (INT 1) and a high of 47 (INT 3). A smaller spread was observed in BANZSL, with a low of 3 tokens (INT 3) and a high of 26 (INT 1). Conversely, the LIS interpreters had a very small spread: The range of fingerspelled sequences for the LIS interpreter was 4–5.

Table 3 shows the most frequently fingerspelled sequences in the interpretations. The first column lists the English words that were fingerspelled a minimum of three times in at least one sign language. Only six items (Bush, Afghanistan, Khe Sanh, Gettysburg, Iraq, Normandy) were fingerspelled by at least one interpreter in each language group. Each of these words was a proper noun (five were place names, and one was the surname of a former US president). Place names occurred most frequently across all languages and thus were examined more closely than other fingerspelling sequences (see the later section titled “Fingerspelling of Place Names in Sign Language Interpretations” for further discussion).

All of the words fingerspelled by the LIS and BANZSL interpreters were also fingerspelled by at least one interpreter in each of the other language groups. However, two language groups, ASL and ISL, rendered English lexical items that no other language group fingerspelled. “Muslim” was produced as a fingerspelling sequence only in ASL, where it occurred six times. The words “enemy” and “loyal” were

TABLE 3. Frequency of Fingerspelled Sequences in Interpretations (Ordered by Frequency from Highest to Lowest Based on the Highest Total in One of the Languages)

Fingerspelled Sequences*	ASL	BANZSL	ISL	LIS
MUSLIM	6	0	0	0
UNITED STATES	6	2	0	0
MARKET	6	0	2	0
BUSH	4	2	5	5
AFGHANISTAN	4	3	4	3
HINDU	4	1	2	0
CITIZENSHIP	2	2	4	0
LOYAL	0	0	4	0
CIVIL	4	3	3	0
KHE SANH	2	2	3	1
GETTYSBURG	3	1	3	3
IRAQ	3	2	3	2
NORMANDY	3	2	3	3
ECONOMY	0	3	1	0
ENEMY	0	0	3	0

* Only fingerspelled sequences that occurred at least three times are included in this table.

produced as fingerspelled sequences only by the ISL interpreters, three and four times respectively.

Frequency of Lexicalized Fingerspelling in Sign Language Interpretations

For lexicalized fingerspelling, variation in both items and frequency was evident throughout the interpretations. Notably, the LIS interpreters produced no lexicalized fingerspelling when rendering the address. As previously mentioned, lexicalized items are quite infrequent in LIS discourse. Instead, the LIS interpreters used lexical signs rather than lexicalized fingerspelling throughout their interpretations. We note that the absence of lexicalized fingerspelling in the LIS interpretations may have been influenced by the fact that the source text was in spoken English rather than in spoken Italian.

TABLE 4. Frequency of Lexicalized Fingerspelling in Interpretations (Ordered by Frequency from Highest to Lowest Based on the Highest Total in One of the Languages)

Lexicalized Fingerspelling	ASL	BANZSL	ISL	LIS	Total by Item
#DO	15	12	1	0	28
#WHY	0	0	10	0	10
#ALL	7	0	0	0	7
#BUT	7	0	0	0	7
#IF	4	5	4	0	13
#CITY	0	0	4	0	4
#OR	4	3	2	0	9
#DO IT	1	3	0	0	4
#OATH	0	0	3	0	3
Total by Language	38	23	24	0	85

The ASL interpretations contained the most instances of lexicalized fingerspelling (38 tokens), followed by ISL (24 tokens), and BANZSL (23 tokens) (table 4). Again, no variation occurred among the LIS interpreters and very little among the ISL interpreters. The widest spread of lexicalized fingerspelling appeared among the BANZSL interpreters (0–19 tokens), followed by the ASL interpreters (6–15 tokens).

Instances of #DO, #IF, and #OR occurred in the ASL, BANZSL, and ISL interpretations. As table 4 also shows, the most frequently produced lexicalized fingerspelling was #DO, appearing a total of twenty-eight times in the interpretations. Although high in frequency, #DO was produced by only three of the sixteen interpreters. One ASL interpreter produced #DO a total of fifteen times, one BANZSL interpreter produced #DO twelve times, and one ISL interpreter produced #DO once. The most frequently produced lexicalized fingerspelling in ISL, #WHY (ten tokens), did not occur in the ASL, BANZSL, or LIS interpretations (tables 4 and 5). It is noted that lexicalized forms vary across languages and the results should not be taken to infer that lexicalized fingerspelling is uniform across sign languages.

TABLE 5. Frequency of Lexicalized Fingerspelling by Language and Interpreter

Language	INT 1	INT 2	INT 3	INT 4	Total
ASL	8	9	15	6	38
BANZSL	19	1	0	3	23
ISL	7	3	6	8	24
LIS	0	0	0	0	0

Fingerspelling of Place Names in Sign Language Interpretations

Table 6 presents data on fingerspelled place names. As anticipated, each of the participants fingerspelled at least some of the place names cited in the speech, but once again we see variation in the type and number of fingerspellings produced both within and between the language groups. The LIS interpreters fingerspelled the fewest place names (thirteen). Of the place names rendered by the LIS interpreters, seven were produced using only the initial letter of the word. In particular, two of these items, both fingerspelled by the same interpreter, feature the initial letter repeated.

The data appear to show similarities in the category of place names, with the ASL, BANZSL, and ISL interpreters attempting to fingerspell all of the place names in the speech, with the exception of “US,” which was not produced by any of the ISL interpreters and produced by only one BANZSL interpreter. We note that ASL, BANZSL, and ISL have a lexicalized sign for “US” (or “America”). The ISL interpreters signed AMERICA throughout the speech.

Accuracy of Fingerspelling of Place Names in Sign Language Interpretations

As tables 6 and 7 show, full and partial fingerspelling of place names occurred in all of the interpretations. Only the LIS interpreters used the first initial of the place name in their interpretations. A high incidence of omission of place names and partial spellings occurred, both within and among the languages. The place name “Iraq” was most consistently fully spelled (8 fully fingerspelled; 3 partially fingerspelled; 5 omissions). “Afghanistan” was the place name that was produced,

TABLE 6. Fingerspelled Place Names by Language and Interpreter (Alphabetical Order)

Place Names in Speech	ASL Production by Interpreter	BANZSL Production by Interpreter	ISL Production by Interpreter	LIS Production by Interpreter
Afghanistan	AFGEN	AFGHANISTAN	AFGHAN	AFGNISTAN
	—	AFGHAN	AFGHANSITAN	A
	AFGHANISTAN	AFGHANISTAN	AFGHANISN	AFGHANISTAN
	AFGHANISTAN	AFGHANISTAN	AFGHANITN	—
Arlington	ARLIN	ARLINGTON	ARITON	—
	—	ARLIN	—	—
	ARLINGTON	—	ARLIGTN	—
	ARLINGTON	—	—	A
Concord	CONDRD	CONCORD	COND	—
	COD	—	CONDRD	—
	—	—	—	—
	CONCORD	—	—	—
Gettysburg	GAYTYBRG	GETTYSBURG	GEDYSG	G
	GETYSBRG	GAYTYBRG	GETTYSBURG	—
	—	—	—	G
	GETTYSBURG	—	GETYSBG	G
Iraq	IRAQ	IRAQ	—	—
	IRAQ	IRAQ	IRAQ	IQ
	—	IRAQ	IRQ	IRAQ
	IRAQ	—	IQ(?)E	—
Khe Sanh	—	KHE SAHN	KHESHEN	—
	KHESHN	—	KHESHEN	—
	—	KHESHN	KHESHN	—
	KHE SAHN	—	—	KK
Normandy	NRMDY	NORMANDY	MNSUNDY	NORWAY
	NORBCY	NRMDY	NORMPY	—
	—	—	—	NORMANDY
	NORMANDY	NORMANDY	NARY	NN
United States	US	US	—	—
	UNITED STATES	—	—	—
	US	—	—	—
	US	—	—	—
Total	24	18	20	13

TABLE 7. Fingerspelled Place Names by Category (Fully Fingerspelled, Partially Fingerspelled, or Initialized). Total Possible for Each Place Name Is 16

Place Names	Fully Fingerspelled	Partially Fingerspelled	Initialized	Total
Afghanistan	7	6	1	14
Arlington	3	4	1	8
Concord	2	4	0	6
Gettysburg	3	5	3	11
Iraq	8	3	0	11
Khe Sanh	0	7	1	8
Normandy	4	7	1	12
United States*	5	0	0	5
Total	32	36	7	75

* A sign for “United States” (or “America”) exists in ASL, BANZSL, ISL, and LIS.

or attempted, most consistently by all of the interpreters (7 fully fingerspelled; 6 partially fingerspelled, 1 initialized; 2 omissions). Of the 75 place names the interpreters attempted to fingerspell, only 32 were fully fingerspelled, and slightly over half (36) were partially fingerspelled.

Discussion

Next we revisit our research questions in light of the hypotheses given in the first section. We also explain the sociolinguistic factors that may explain the results of the study, including interpreters’ language attitudes and perceptions of the deaf audience.

Frequency of Fingerspelling Sequences in Interpretations

As anticipated, the ASL interpreters produced the greatest number of fingerspelling sequences (137 tokens), a hypothesis that was noted by Padden and Clark Gunsauls (2003), who reported that deaf ASL signers produced the most fingerspelled items among sign language users. Thus, the common perception that fingerspelling is pervasive in ASL is supported by our study. That view is illustrated by a comment from one of the BANZSL interpreters about the ASL interpreters: “Well, they’ll just fingerspell everything. ’Cause that’s what Americans do, they fingerspell everything” (BANZSL INT 3).

The ISL interpreters produced the second highest number of fingerspelled sequences (96 tokens). This number may be explained in part by a closer examination of the output of the male ISL interpreters. The ISL interpreter, INT 2, with the lowest fingerspelling output (15 tokens), was a male. At first glance, this low number of fingerspelled items contrasts with what one might expect for a male signer, as studies suggest that male ISL signers are more likely than their female counterparts to fingerspell (Fitzgerald 2014; Leeson and Saeed 2012). However, this situation is better understood after reading comments made by ISL INT 2 during the interview, in which he reported making an effort to minimize his fingerspelling production in a bid to render the speech accessible to a broad-based population of grassroots deaf audience members. In contrast, the other male ISL interpreter, INT 3, had the largest number of fingerspelled sequences (47 tokens) in the ISL dataset. Interestingly, INT 3 also stated in his interview that he attempted to minimize his fingerspelling as much as possible. Despite his resolution to produce less fingerspelling, INT 3 produced nearly half of the total number of fingerspelled sequences in the ISL data. This variation between male ISL interpreters indicates the variation that occurs even among interpreters who are trying to control their fingerspelling output.

The fairly high number of fingerspelled sequences in the ISL interpretations could be due to the fact that ISL is a one-handed system (see Cormier, Schembri, and Tyrone 2008) with regard to the phonological and morphological constraints of two-handed fingerspelling systems. However, LIS also uses a one-handed system and showed very little fingerspelling. Rather than attributing the frequency of fingerspelling in a sign language to a single factor, prior studies suggest that several factors may be at play (e.g., negative attitudes toward the use of fingerspelling in LIS by deaf people, educational conditions that do not promote the use of fingerspelling).

The BANZSL interpreters produced 53 fingerspelled sequences, less than half the number employed by the ASL interpreters and about half of those produced by the ISL interpreters. This lower number might be attributed to the difference in fingerspelling between BSL and Auslan interpreters. On closer analysis of the BANZSL results, it appears that the BSL and Auslan interpreters use fingerspelling much as deaf BSL or Auslan signers do (i.e., more or less respectively). Most

of the fingerspelling sequences (26 tokens) among the BANZSL interpreters were produced by an Auslan interpreter (INT 1). Auslan INT 2 produced the second highest total (15 tokens), followed by one of the BSL interpreters (INT 4), who produced 9 fingerspelling sequences, and the other BSL interpreter, who produced 3 fingerspelling sequences. These results support the general observation that deaf signers in Australia may use more fully fingerspelled English words than do signers in the United Kingdom, who rely on initialization (Sutton-Spence 2006). Further, the results point to a collection of factors (e.g., age of language acquisition and linguistic environment) that may influence the interpreters' fingerspelling output.

Finally, the LIS interpreters produced comparatively few fingerspelled sequences (18 tokens), all of which represented proper nouns (e.g., Bush, Gettysburg, Normandy). This low number may be explained by claims made by Beronesi, Massoni, and Osella (1991), who state that LIS users view fingerspelling as a form of communication that is restricted to deaf education settings rather than as a legitimate linguistic feature of LIS. Thus, fingerspelling represents a default solution for LIS interpreters when faced with a word in which the corresponding sign is unknown. For example, one LIS interpreter noted the following: "When he named Bush, I tried to recall the name sign, but I couldn't remember it. I got lost, and I *had to* fingerspell it" (emphasis added) (LIS INT 3).

However, the limited number of fingerspelled items may also have been affected by the fact that three of the four LIS interpreters had English as their third language and that the participants did not consider English to be one of their working languages. As English is not the ambient spoken language for the LIS interpreters, they had the additional challenge of working from a source language of which they were not native speakers. This may account for the missing passages and omitted names in the LIS interpretations. The results tentatively suggest that the low frequency of fingerspelling by interpreters is similar to the infrequent production of fingerspelling by deaf LIS signers, but further study under controlled conditions would be necessary to make definitive conclusions.

The range of fingerspelling sequences produced by the interpreters in three of the groups was notable: The ASL interpreters produced a range of 15–61 fingerspelling sequences; the ISL interpreters, 11–47;

and the BANZSL interpreters, 3–26. Conversely, although the LIS interpreters produced only a few fingerspelling sequences, their range was fairly uniform (4–5 tokens). These ranges suggest both a lack of standardization in fingerspelling production among interpreters and their use of fingerspelling as a stylistic feature.

Frequency of Lexicalized Fingerspelling in Interpretations

We hypothesized that the frequency of lexicalized fingerspelling would mirror the overall frequency count, with ASL having the greatest frequency of such tokens. This hypothesis was borne out: The ASL interpreters produced the greatest number of lexicalized fingerspellings (38 tokens). We were also interested in learning whether lexicalized fingerspelling was evenly distributed in the overall frequency data. A review of the percentage of lexicalized, fingerspelled items produced in each language pair indicated that lexicalized fingerspelling did not affect the overall frequency. The most frequently produced item was #DO, which appeared 28 times in the interpretations. One BANZSL interpreter produced #DO 12 times, in line with Schembri and Johnston's (2007) observation that #DO is one of the most frequently fingerspelled items in Auslan. In addition to #DO, two other lexicalized items appeared in ASL, BANZSL and ISL: #IF (4, 5, 4, respectively) and #OR (4, 3, 2, respectively).

Fingerspelling and Accuracy of Place Names in Interpretations

We examined place names because fingerspelling studies point to a high prevalence of nouns (both common and proper) in fingerspelling (Padden and Clark Gunsauls 2003). Also of interest were the number and the type of fingerspellings the participants produced. Eight place names were spoken in President Obama's address (table 6). Only one place name—"United States"—has an established sign (AMERICA) in all of the languages studied here; it was used by two of the BANZSL interpreters and all of the ISL and LIS interpreters. Taking into consideration the availability of a lexical sign, the source text contained 118 possible instances of place names for participants to fingerspell. However, among all of the participants, only 75 place names were fingerspelled, and these were either fully fingerspelled, partially fingerspelled, or initialized.

Of these 75 fingerspelled place names, 32 were fully fingerspelled,

36 were partially fingerspelled, and 7 were initialized. Of the fully fingerspelled place names, one item was misunderstood (Normandy was fingerspelled as N-O-R-W-A-Y by a LIS interpreter). We note that the partial fingerspellings of place names were not standard in any way among the interpreters. That fewer than two-thirds of the total possible fingerspellings of place names were produced was somewhat surprising, although this result may be explained in part by the interpreters' lack of familiarity with the various countries that were mentioned in the speech. However, even the ASL interpreters produced partial or truncated fingerspellings of place names, including those for well-known historical sites, such as Arlington, Concord, and Gettysburg. The ASL interpreters produced a total of 24 fingerspelled tokens (out of 32 possible), and only 14 were fully fingerspelled. The production of certain items was revealing as well. "Iraq" was the place name most consistently fully fingerspelled (8 fully fingerspelled out of 11 attempts); "Afghanistan" was produced, or attempted, most consistently across languages and "Khe Sanh" was not fully fingerspelled by any of the seven interpreters who attempted it (additionally, one LIS interpreter initialized it as KK). Interestingly, although initialization is often attributed to ASL, BSL, and ISL interpreters, only the LIS interpreters initialized place names.

Why were so few place names fingerspelled, and why were there so many partial renditions? Factors that may explain these results are the following: lack of familiarity with the place names; inability to spell the place names; the notion that a reduced version of the place name would be sufficient to convey the meaning; and conscious omission of the place names, perhaps in the belief that its inclusion was not critical to the overall message. Moreover, some interpreters may have decided that a more superordinate view of the event should be portrayed (e.g., things that happened in a particular place, such as Southeast Asia, or at a particular time, such as World War II). In all likelihood, the number of partial fingerspellings, initializations, and omissions represent more than one of these, or other, factors.

Potential Sociolinguistic Factors Affecting Fingerspelling Production

Considering the number and variety of fingerspellings used by the interpreters, we suggest two general explanations for the data results. First, it seems obvious that fingerspelling production in sign

language interpreting is at least somewhat affected by the interpreters' knowledge of the content of the source text; fingerspelling production also appears to be reflective of interpreters' consideration of audience needs. We suggest that these are interdependent rather than distinct factors and that they reflect a complex picture of the many decisions that interpreters must make.

For the ASL, BANZSL, and ISL interpreters, Obama's many references to significant events or locations in US history seem to have influenced their fingerspelling output. In retrospective interviews, several of the BANZSL and ISL interpreters stated that they did not have the historical and cultural knowledge that an American interpreter might have, which influenced the decisions they made when fingerspelling. It is possible that the ISL and BANZSL interpreters believed that the cultural weight of the source messages might not resonate with their audience as a result of cultural distance, predicated at least in part by their own limited knowledge of some of the subject matter in the inaugural speech. Interviews with the BANZSL interpreters confirmed this, as illustrated by the following extract from BANZSL (INT 1) in relation to Arlington Cemetery in Washington, DC:

Arlington. I went, hmm, "I don't know what Arlington is. I don't know. I have no idea." In my head, I thought, it must be some historical place of war. Is that right?

Interviewer: Arlington is actually the cemetery in Washington, DC where all the soldiers are buried.

Oh . . . I didn't know that. So I remember thinking, "American audiences could fingerspell it. They'd get it. Australian audiences, you'd have to expand, but I wouldn't know how to explain." (BANZSL INT 1)

One BANZSL interpreter commented on not understanding the significance of Khe Sanh and assumed that American interpreters (and deaf people) would have a better appreciation of what it was:

There's a lot in there that isn't really said. There's a lot that's implicit information, which is, I think . . . it will be really interesting to know how North American interpreters have dealt with it because they will have much more understanding of what's implied. And I was struggling with a lot of it on kind of two levels. One, just because it's just kind of the rhetoric, the nature of the piece. But also not

having that kind of foundational knowledge and to be able to kind of unpack it myself. That was, that was the problem. And . . . I completely, I had no idea whether this place was Vietnam or Cambodia, so I thought, “I’ll hedge my bets and just say Southeast Asia.” Yes, but I thought I could fingerspell that name, and the people here wouldn’t have a clue actually. So, as I said, I had no idea whether that was Cambodia or Vietnam. I presumed that Concord and Gettysburg were kind of important, but that was by guess. (BANZSL INT 3)

It is interesting to note that the LIS interpreters demonstrated knowledge of several of the historical references, as evidenced in their preparation or interview comments. This awareness may be attributed to the emphasis on Western history in the Italian educational system, a focus that is further stressed in LIS interpreter education. This was exemplified in the comments made by three of the four LIS interpreters regarding the significance of the Normandy landings. They also identified both Gettysburg and Concord as critical American battlefields even without being certain of the exact context. In addition, two LIS interpreters deduced that Khe Sanh was an important American battle and, based on the word form, speculated correctly that the event took place during the Vietnam War.

Overall, interpreters in each language group expressed not only their own frustration with understanding and rendering historical references but also their belief that a hypothetical deaf audience might have problems in understanding their interpretations:

When I was reading [the speech] as preparation, I knew, I could just see I was never going to get all those fingerspell items out. And, you know, as an interpreter I think it is really, really important that we accept that if you are going to fingerspell at a million miles an hour to deaf people in an audience on the Internet or at the context that you gave me, they’re not going to remember. It’s too fast. And the fact that you are able to get it out is not important. What’s important . . . are they able to comprehend it? It’s much easier to go . . . France, World War II, Korea, and the Civil War rather than Concord, Gettysburg, Normandy, and Khe Sanh. I mean they’re almost impossible to get out in the amount of time that you got without getting too far behind, and then you start missing stuff. (BANZSL INT 2)

Despite a culture of fingerspelling in ISL (particularly by male signers), the challenge of incorporating fingerspelled place names proved cognitively challenging, given the complexity of the source

text and the cultural and conceptual gaps that the interpreters had to deal with when working in ISL. For example, ISL INT 1 noted that, when he had tried to clearly fingerspell place names such as Afghanistan, the effort placed on the correct production led to the omission of a subsequent concept: “Yeah, [the phrase] ‘old friends and former foes,’ I just . . . because I’m fingerspelling ‘Afghanistan,’ I just didn’t keep up with that, and I lost it” (ISL INT 1).

In addition, ISL INT 1 commented on not having recognized that the reference to Arlington was important when he read the script of the speech and said that he was not sure he had spelled it correctly: “Reading the script the first time, I didn’t see ‘Arlington’ as I went. And I heard Arlington and I was like, ‘oh, I’d have to put in that because I suppose it’s significant.’ Mm, but I don’t think I spelled it correctly” (ISL INT 1).

Yet, the trade-off between the inclusion of proper nouns and other core concepts forced the ISL interpreters to make decisions: “But, in hindsight, whether or not getting those place names in was more important than the content of other things I missed out on, um, I probably wouldn’t have focused on getting them in, you know . . . giving that so much time” (ISL INT 1).

Instead, ISL interpreter 1 focused on the transmission of higher-order concepts and the emotional impact of the content: “Probably would have tried to get in more of the emotiveness of the fact that people suffered for America to get to where we are now and . . . yeah, the names of places was kind of irrelevant” (ISL INT 1).

In at least one case, there was conscious consideration of how to handle the nuances of the content. For example, ISL INT 3 noted the following: “I just remember at that time thinking, hearing ‘United States of America’ and thinking ‘Do I do that? Do I do that fingerspelling?’ and then for the rest of the piece I just did ‘America,’ ‘President of America,’ and obviously there might be issues with that in relation to continent of ‘America’ versus [the] country of the United States” (ISL INT 3).

In interviews, the ISL, BANZSL, and LIS interpreters suggested that ASL interpreters would struggle less with the fingerspelling due to their knowledge of the historical events and the geographical locations mentioned in the speech. Two ASL interpreters indicated feeling some success with these references but also reported difficulties:

No, I think I would prepare the same way. I got the gist of the speech down, and even if, um . . . I'm remembering now. I'm looking at the paper. He said, "When our forefathers died in Arlington." I didn't fingerspell "Arlington," but I do remember signing "when they died" previously [and] how their ideas still gave us the courage we needed [GIVE-TO-ME STRENGTH], so I don't think I would prepare differently because I think the gist of the speech came out. There were specifics that, if you had more time, you would probably be able to get down. (ASL INT 2)

Uh, I wrote down Concord, Gettysburg, Normandy, and Khe Sanh because I, in the moment, wasn't sure I'd remember how to spell any of them. Even "Concord," I was like, "uh . . ." (shakes head), y'know, who knows in the moment what's going to happen? (ASL INT 3)

I was happy enough with that fingerspelling. I knew that was coming up, and I did not know if I was going to remember how to spell Khe Sanh (chuckles). I was like "K-H-E, yeah!" So when I did that, you'll see a bit of that relief on my face that I got all those places out, and I didn't know the signs for any of them. I had to fingerspell them. (ASL INT 2)

In response to the phrase "For us, they fought and died, in places like Concord and Gettysburg, Normandy, and Khe Sanh," ASL INT 4 stated the following:

Argh. Hate this phrase. Because when I was practicing, I thought, "Okay, I'm just going to do the Civil War, World War I, World War II, Vietnam." And then, as soon as it started, it was like, "I don't know." I ended up spelling the first one, and then I was toast. It's like, I got the three cities, but I don't know how to spell "Khe Sanh." So I [signed] "Vietnam." And it was just like, that wasn't pretty. It just didn't feel respectful in the way . . . I mean, it's so loaded. (ASL INT 4)

In addition to familiarity with place names, another factor influencing the interpreters' decision making was their consideration of audience. For example, in Ireland, it is estimated that relatively few deaf people regularly work with interpreters. Professional interpreting began to emerge only in the early 1990s (Leeson and Lynch 2009), and interpreters work predominantly in educational settings (Leeson 2012). To date, only about 10 percent of Irish deaf people have had access to higher education, which is the setting in which most deaf people encounter interpreters. Given this, a significant portion of the Irish deaf community has not worked with interpreters. This, in

turn, influences the way in which interpreters conceive of providing access for a highly heterogeneous population in which gendered and generational variation is rife (Leeson 2005). Further, the historical lack of participation in higher education has affected the functionality of ISL; with so few professionals using ISL in their fields, the language has not developed the lexical range associated with those disciplines. As a result, the challenge is inevitably greater when one attempts to interpret a complex monologue peppered with culturally embedded metaphors to a linguistic community that has been denied access to political processes.

The same could be said for the United Kingdom, where increasing numbers of deaf students are now entering higher education, but the proportions are still lower than among the wider population (Barnes, Harrington, Williams, and Atherton 2007). Although increasing numbers of deaf graduates are finding employment (Fleming and Hay 2006), and thus more interpreters are engaging regularly with deaf professionals in the workplace (Dickinson 2014), the lexical range of BSL remains comparatively restricted insofar as the number of established deaf professionals in various fields is lower than that found in the United States.

Nevertheless, in the United States, the issue of how to best accommodate the linguistic preferences of a deaf audience is also a challenge for interpreters. In a related study, five deaf ASL teachers or interpreters were asked how they would render the opening words of Obama's address (i.e., "My fellow citizens") (Swabey, Nicodemus, Cagle, and Beldon 2016). In their responses, the participants' noted the challenges of interpreting for a diverse deaf audience, particularly for a high-profile televised event. They acknowledged that some deaf viewers would prefer a more literal interpretation, which included fingerspelling or mouthing of English words, and that many other deaf viewers would not be fluent in English. Thus, even bilingual, highly educated deaf translators were stumped by how to best meet the needs of the audience and stated that they had to accept that there was no single clear choice in how to render the speech.

Conclusion

In this study, a single English source text served as the stimuli for sixteen interpreters who translated a target message into one of four

different sign language groups (ASL, BANZSL, ISL, and LIS). The video-recorded data were examined for frequency of fingerspelling sequences, with special attention to lexicalized fingerspelling (e.g., #DO, #WHY) and to the fingerspelling of place names (e.g., Iraq, Khe Sanh, Gettysburg). Although it was not surprising that most of the fingerspelling occurred in the ASL renditions, the frequency range among the interpreters was notable, particularly in view of the fact that each interpreter was given the same instructions with regard to interpreting the address. The fewest fingerspelling sequences occurred in the LIS interpretations. Retrospective interviews with the participants suggested that several sociolinguistic factors, including interpreters' attitudes toward and perceptions of the deaf audience, influenced the interpreters' decisions with regard to what words to fingerspell.

Although this study sheds light on fingerspelling usage by interpreters, any inferences we might draw from these findings should be carefully considered for the following reasons: The sample size is small; the original text is most likely more familiar to ASL-English interpreters than to the other groups; preparation time was limited; participants did not know the content of the speech before accepting the task; and there was no live audience. Despite these conditions, these data add new information about the number, range, and accuracy of fingerspelling in sign language interpreting. The results indicate variation in the interpreters' use of fingerspelling. Further, we suggest that various sociolinguistic factors, including language attitudes and consideration of the deaf audience, play a role in fingerspelling output.

Future studies could build on this work by examining fingerspelling in interpretations done consecutively, with a larger pool of interpreters, as well as with the inclusion of a significant number of deaf-parented interpreters and deaf interpreters. In addition, other aspects of fingerspelling (e.g., mouthing, initialization) are ripe for investigation. Finally, incorporating input from deaf audience members in response to the rendering of fingerspelled items could also be a fruitful area of study.

Despite its frequency and the critical functions in the rendering of formal speeches by interpreters, little investigation into fingerspelling has been conducted. We argue that researchers, educators, practitioners, and deaf audiences can benefit from a greater understanding of the

linguistic and sociolinguistic factors that drive interpreters' decisions in their fingerspelling production.

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Notes

1. The catalogue *Ethnologue* (www.ethnologue.com) lists more than seven thousand living languages, of which 138 are categorized as “deaf sign languages.”
2. Ethiopian Sign Language uses a syllabary fingerspelling system, while sign languages related to Arabic and Hebrew use non-Roman alphabets.
3. Lexicalized fingerspelling of the name of the language—LIS—began in the mid-1980s, when it replaced the use of the 3 handshake *SIGNING*.
4. The text of the original speech is available on many Internet sites (e.g., <http://www.nytimes.com/2009/01/20/us/politics/20text-obama.html>). Video recordings can also be found on the Internet (e.g., <http://www.youtube.com/watch?v=VjnygQo2aW4>).
5. LIS interpreters were provided with an English-Italian bilingual dictionary.

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