

# Pronouns in ASL-English Simultaneous Interpretation

David Quinto-Pozos

University of Texas at Austin, davidqp@austin.utexas.edu

Kierstin Muroski

Mount Aloysius College, kmuroski@mtaloy.edu

Emily Saunders

University of Texas at Austin, ecsaunders97@gmail.com

Follow this and additional works at: <https://digitalcommons.unf.edu/joi>



Part of the [American Sign Language Commons](#), [Language Interpretation and Translation Commons](#), and the [Other English Language and Literature Commons](#)

## Suggested Citation

Quinto-Pozos, David; Muroski, Kierstin; and Saunders, Emily () "Pronouns in ASL-English Simultaneous Interpretation," *Journal of Interpretation*: Vol. 27 : Iss. 1 , Article 3.

Available at: <https://digitalcommons.unf.edu/joi/vol27/iss1/3>

This Article is brought to you for free and open access by the Department of Exceptional, Deaf, and Interpreter Education at UNF Digital Commons. It has been accepted for inclusion in Journal of Interpretation by an authorized editor of the JOI, on behalf of the Registry of Interpreters for the Deaf (RID). For more information, please contact

[len.roberson@unf.edu](mailto:len.roberson@unf.edu).

© All Rights Reserved

---

# Pronouns in ASL-English Simultaneous Interpretation

## **Cover Page Footnote**

The authors would like to thank the University of Texas Signed Language Research Lab members who worked on this study: Christian Barthlow, Chloe Gomez, Lauren Kelley, Marcus Martinez, Phoebe Mintz, Emily Saunders, Madison Stacey, Kathryn Whitley, and Roxanne Zech. In addition, Kierstin Muroski assisted with data coding and a conference presentation. We thank participants and colleagues at the Second Symposium on Signed Language Interpretation and Translation Research for their comments and feedback.

# Pronouns in ASL-English Simultaneous Interpretation

**David Quinto-Pozos**

University of Texas at Austin

**Kierstin Muroski**

Mount Aloysius College

**Emily Saunders**

University of Texas at Austin

## ABSTRACT

Pronominal systems across languages mark grammatical categories in different ways, and this can pose challenges for simultaneous interpretation. Pronouns can also be ambiguous, for example, by collapsing distinctions in some forms or by resembling demonstratives. We examine pronouns produced by a Deaf signer of American Sign Language (ASL) within a TEDx talk and how they are interpreted (simultaneously) by an ASL-English interpreter. Pronouns from both languages were coded and scrutinized for semantic correspondence across the two languages. Robust correspondences were found with some personal pronouns, especially first-person forms. However, mismatches across languages, in particular third-person forms and demonstratives, provide evidence of pitfalls for interpretation. In particular, we suggest that the ambiguous nature of some forms (e.g., third-person pronouns and singular demonstratives) can cause challenges for simultaneous interpretation across modalities.

## INTRODUCTION

The work of professional language interpreters is cognitively demanding, and some of the most talented interpreters work in high-stakes and stressful situations such as those involving political negotiation (e.g., spoken language interpreters at the United Nations) or academic debate (e.g., signed-spoken language interpreters at linguistics research conferences). Unfortunately, there is comparatively little empirical research on interpretation in high-stakes settings and the linguistic and cognitive factors that impact an interpreter's work.

Even for professional interpreters, the challenge of moving between languages is not trivial. This challenge can be intensified by high-stakes and stressful situations, such as those involving political negotiation (e.g. spoken language interpreters at the United Nations) or academic debate (e.g. signed-spoken language interpreters at linguistics research conferences). In the case of conference interpreters, the goal is to take a speaker's technical—and often complex—messages and deliver equivalent content in another language in real-time. The two languages may differ in grammar and vocabulary, and the languages could mark different distinctions – a primary example is formal versus informal marking on pronouns and verbs in Romance languages, which are not a part of the grammar of all languages. Such distinctions can create particular challenges for the interpreter (Shlesinger, 1995; Takimoto & Koshiba, 2009; Quinto-Pozos, Alley, Casanova de Canales, & Treviño, 2015). The impact of grammatical differences like pronoun usage on simultaneous interpreting performance is notable and has been shown in Hebrew and English (Shlesinger, 1995), Mandarin Chinese and English (Fu, 2016; Wang, 2014; Zhan, 2012), and Japanese and English (Takimoto & Koshiba, 2009), among others. The interpretation of pronouns across languages is also influenced by

factors such as memory (Timarová et al., 2014; Wang, 2016) and other cognitive processes engaged during interpretation (Gernsbacher & Shlesinger, 1997).

The topic of grammatical differences across languages, and the impact of those differences on interpreter decisions, is very relevant to interpreters and researchers in the field of translation and interpreting studies (TIS). Even so, there has also been a long tradition of placing primary consideration on meaning, rather than the form of a message. In writings on translation and interpreting studies (TIS) from several decades ago, Seleskovitch (1977) asserted that interpreters should not provide a literal translation of every word or phrase that appears in the source language (SL), but rather make decisions about how best to communicate the meaning of the SL within the target language (TL). This also means that interpreters might choose to omit aspects of the SL form (e.g., specific occurrences of lexical items or grammatical features), especially if the meaning is preserved using other TL lexical or grammatical strategies (e.g., the use of pronouns). Napier (2004) supports this general philosophy by describing common omissions in interpreting. In particular, she notes that omissions can be of various types (conscious strategic omissions, conscious intentional omissions, conscious unintentional omissions, conscious receptive omissions, and unconscious omissions). Thus, one might expect experienced, highly-skilled, interpreters to make reasoned decisions concerning aspects of meaning and form, with the ultimate goal of preserving aspects of meaning in the TL. Sridhar, Chen, & Bangalore (2013), in an analysis of English and Spanish data from the European Parliamentary interpretation corpus (EPIC), found that interpreters would use so-called deictic terms in the TL (specifically, pronouns that serve as anaphora<sup>1</sup> for full forms or common nouns instead of proper nouns) where full forms were used in the SL. The authors suggest that this is done because, “it takes a shorter amount of time to pronounce these expressions instead of their full form equivalents.” (p. 4). Interpreters frequently employ strategies for accurately interpreting meaning, even though the form may differ between SL and TL constructions. However, we argue that there is value in considering the grammatical forms used in an interpreted setting, as well as meaning.

Pronominal systems are diverse across languages, and this may contribute to the challenges that such systems pose for simultaneous interpretation. Pronouns commonly mark various grammatical distinctions (person, number, gender, case, formality, etc.), and languages can differ with respect to the specific categories that are marked (e.g., signed languages do not typically indicate gender distinctions on pronouns, whereas spoken languages often do so on third person singular forms; see McBurney 2002 for a comparison of a variety of spoken and signed language pronominal systems). In Portuguese a single personal pronoun (e.g., *ele*) communicates grammatical person (3<sup>rd</sup> person), number (singular/sg), and gender (male), whereas a corresponding pronoun in Brazilian Sign Language (Libras) (e.g., IX-3sg<sup>2</sup>) does not encode gender. With these types of constructions an interpreter would need to make a decision about how to communicate information that may or may not have been previously established by the speaker.

From a morpho-syntactic point of view there is considerable variation across languages with respect to pronoun use. Some languages license pro-drop constructions (i.e., those where the pronoun is null or not overtly realized outside of the verbal construction), and others require pronouns in subject and/or object position (Lillo-Martin, 1991). Signed languages are generally

<sup>1</sup> See the Table 4 in the Appendix for a list of some of the linguistic terms used in this article.

<sup>2</sup> Transcription conventions: “IX” is used to represent “index” or “point”, followed by a location designation (e.g., “1” the signer, “2” the signer’s interlocutor[s], and “3” an entity that is not the signer or interlocutor) and a number designation (e.g., “sg” = singular, “pl” = plural).

pro-drop languages and subject pronouns are not required in many contexts (see Sandler & Lillo-Martin, 2006, Lillo-Martin & Meier, 2011), which is particularly relevant for interpretation involving a spoken language that does not allow null pronouns. Some verb types in signed languages allow for rich morphological marking such as person, number, and aspect, similar in form to spoken languages with rich verbal inflections (e.g., Romance languages). In addition, signed languages commonly license *shifted reference* constructions. In such constructions, first person forms take on a third person reference, such as in direct quotation (see Metzger, 1995; Liddell & Metzger, 1998; Lillo-Martin, 1991).

Whereas the processing of pronouns has been studied extensively, pronouns have only been minimally addressed in simultaneous spoken-spoken language interpretation (e.g., Gernsbacher & Shlesinger, 1997; Shlesinger, 1995; Takimoto & Koshiba, 2009; Wang, 2014; Zhan, 2012) and signed-spoken language interpretation (Pereira, 2014; Quinto-Pozos, Alley, Casanova de Canales, & Treviño, 2015). With regard to the former, one example is Takimoto & Koshiba, who examined footing shifts in Japanese-English interpretation considering pronominal forms. The authors found that the interpreter in the study was generally able to accurately interpret pronominal information, despite differences in grammar across the two languages. However, at times the interpreter would fail to engage in footing shifts that would have allowed people to be aware of the intended addressee. With regard to signed-spoken language interpreting, Pereira, who is notably relevant for the current study, looked at forms of address that Brazilian Sign Language (Libras)-Brazilian Portuguese (BP) interpreters used when Deaf university students interacted with hearing people in classrooms, meetings, interviews, and during a presentation. The author framed her analysis in terms of *stance-taking*, which focuses on discursive features of language use (Jaffe, 2009; Kärkkäinen, 2006). The author found that the interpreters, when producing BP, aligned their pronoun use with the perspective of the Deaf participants. In other words, the interpreters overwhelmingly used first person forms (e.g., first person singular *eu*, first person plural *a gente*, etc.) in favor of third person forms for representing the stance of Deaf people for whom they were interpreting.

Pronouns provide a particularly useful focal point for analyzing the work of interpreters because they are extremely frequent in language use. They are among the most frequent lexical items in English (e.g., Corpus of Contemporary American English, <http://www.wordfrequency.info/top5000.asp>), Portuguese ([https://en.wiktionary.org/wiki/Wiktionary: Frequency\\_lists/Portuguese\\_wordlist](https://en.wiktionary.org/wiki/Wiktionary:Frequency_lists/Portuguese_wordlist)), and American Sign Language (ASL) (Morford & MacFarlane, 2003; Mayberry, Hall, & Zvaigzne, 2013). It is common for pronominal forms to be phonologically reduced in discourse and produced rapidly (Bybee, File-Muriel, & Napoleão de Souza, 2016), which poses challenges for interpreter comprehension of the source language.

Many signed language pronouns take the form of an extended index finger directed toward a present referent or a location that represents the referent, which provides a clear and unambiguous way to encode the grammatical person, including both singular and plural/dual distinctions<sup>3</sup>. For example, a first person singular pronoun in ASL is formed by the signer pointing to her/his torso area. With this in mind, McBurney (2002) poses that signed language pronouns are generally high in *referential specificity*, a feature she defines as "...the degree to which full referential information is recoverable from the morphology" (p. 344). In particular, McBurney looks at how signed languages typically allow for pronominal points to be directed at distinct locations in the signing space to refer to *unique* referents, and she states that in the

---

<sup>3</sup> First person plural forms are often an exception with regard to picking out their referents in a clear and unambiguous manner.

following way: “The location component of singular pronouns (in all signed languages studied to date) allows for complete and unambiguous identification of referents within a discourse. As a result, the relationship between form and meaning (referent) is non-arbitrary” (p. 344). There appear to be at least two important observations made by McBurney about an extended index finger: 1) presumably, it is not ambiguous about *who* the index finger points to and 2) an imaginary line connecting the tip of the index finger to its referent is seemingly not arbitrary. These features predict that the referent of such pronouns is generally easy to recover for the interlocutor/language perceiver. For example, even though spoken language pronouns typically co-refer to the most recent candidate noun in discourse (e.g., *the woman, the girl, the car*), multiple singular referents in discourse (e.g., *the woman* and *the girl*) are referred back to using a single pronoun (e.g., *she*). In signed languages, however, pronouns for unique third person referents are generally realized by pointing to distinct locations in the signing space (e.g., a point to the right might refer to *the woman* and a point to the left might refer to *the girl*). In this way, the uniquely-directed points pick out unique third person singular referents; in McBurney’s words, signed languages are high in *referential specificity*. This fact about signed languages might encourage high accuracy for third person singular forms in interpreted settings.<sup>4</sup>

However, third person singular points in signed languages are, in reality, ambiguous: they are similar in form to demonstratives, definite determiners, or points to locations or entities in the immediate environment or elsewhere. For example, Koulidobrova & Lillo-Martin (2016) suggest that such points are best described as demonstratives, considering the nature of the pointing (i.e., what is the lexical status of an indexical point) and not simply the locus of the pointing. Such work highlights the high level of ambiguity of such forms. If McBurney’s proposal about pronominal referential specificity were to hold true for signed languages, one could predict that third person singular forms would be accurately interpreted, in general, because of the lack of personal reference ambiguity with such forms. However, the competing issue of semantic ambiguity (points to similar locations can also be definite determiners, demonstratives, or locatives) influences interpretation success.

Given these facts about signed language pronouns, the overarching questions that guided this study were the following: What is the relationship between ASL pronominal patterns exhibited in a formal presentation and semantic equivalents that appear in a spoken English simultaneous interpretation? In particular, what types of pronouns are interpreted most accurately and least accurately? In addition, if ASL pronouns are not matched with English pronouns, are there common patterns that characterize the resulting interpretation? We developed three main hypotheses corresponding to these research questions. In particular, interpretation of signed language pronouns should be:

1. Highly reliable for first person singular and plural pronouns (rationale: little variability in phonological form with respect to handshape and location),
2. Highly reliable for third person singular pronouns (rationale: referential specificity allows the signer to pick out unique third person forms in the signing space),
3. Not highly reliable for points that serve as demonstratives, determiners, location points, etc. (rationale: ambiguity; these forms are homophonous).

---

<sup>4</sup> McBurney (2002) notes that plural forms of pronouns, as opposed to singular forms, are not necessarily indexical and unambiguous. In other words, they may not reliably point to their referents in the same way that singular pronouns do.

We examined these hypotheses with data from a Deaf user of ASL and an interpretation of ASL into English.

## METHODOLOGY

### SOURCE OF LANGUAGE DATA

For this study, our aim was to locate a sample of ASL that was high in pronoun use and was simultaneously being interpreted into English. A video entitled “Deaf in the Military”, which can be found on YouTube ([https://www.ted.com/talks/keith\\_nolan\\_deaf\\_in\\_the\\_military](https://www.ted.com/talks/keith_nolan_deaf_in_the_military)), was used for the SL and TL data. This video is an 18.5 minute TedX talk presented on April 23, 2011 in Los Angeles, California by Keith Nolan, a Deaf man who wished to join the United States Military. Nolan completed two years of Reserve Officers’ Training Corps (ROTC) at California State University Northridge before he was barred from progressing due to a medical disability. In the video, Nolan describes his experience during his time with the ROTC program and provides an argument for why the United States Military should accept Deaf soldiers. As a consequence of the personal nature of Nolan’s account, which includes stories of fellow cadets and officers, the presentation contains a large number of pronouns. Additionally, the talk is being interpreted in real-time into English for hearing audience members. We have little information about the interpreter (certification, years of experience, or education), other than being told by a colleague that “Keith Nolan brought his own interpreter with him for the event” (Christine Mitchell, personal communication, November 15, 2017).<sup>5</sup> This information suggests to us that the interpreter was accustomed to the presenter’s signing style. Based on the type of interpreting assignment (formal presentation, a sizable audience of mixed Deaf and hearing individuals, popularity of TedX talks), our assumption is that this interpreter is highly qualified and rather skilled. A formal academic event such as a TEDx talk would generally call for the services of a highly-qualified interpreter. The first and second author of this study are certified interpreters, and we feel that the interpretation represents professional-quality work performed by a qualified interpreter. One thing to keep in mind is that it is likely both the presentation and the interpretation were rehearsed. Such a practice is common in high-profile interpretation of this nature. We will return to this point in the Discussion section as well as potential implications for the findings of the study.

### PRONOUN CODING AND GENERAL TRANSCRIPTION

The ASL and English productions (by presenter and interpreter, respectively) were coded in Elan (Crasborn & Sloetjes, 2008; <https://tla.mpi.nl/tools/tla-tools/elan/>), which was developed at the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, the Netherlands. Coding tiers were created to document the following:

- glossed transcriptions of all ASL signs produced by the signer following common coding conventions, including the use of capital letters for glosses and “IX” as an abbreviation for indexical pronouns
- a transcription of all English words/sentences produced by the interpreter
- role/referential shifting by the ASL signer
- individual pronouns in each language

---

<sup>5</sup> Note: We were given the name of the interpreter, and we have tried to reach out to that interpreter multiple times via social media, but no response was obtained.

- type/category of each pronoun in each language (personal, demonstrative, indefinite, reflexive/intensive, relative, other)
- semantic and grammatical features of each pronoun in each language (person: 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>; number: singular, plural, other; demonstrative: singular, plural, etc.), which were coded on separate tiers<sup>6</sup>
- values for phonological parameters (handshape, location, movement) for the pronouns in ASL (additional analysis not included in this manuscript); these were coded on separate tiers

For some of the tiers, controlled vocabularies were created to encode the data and for others they were left as free-text. All data were coded and examined by multiple coders to ensure accuracy, including extensive review by the first author of the study.

### **PRONOUN MATCHING ACROSS LANGUAGES**

The pronoun matching analysis was designed to capture semantic matches between pronouns across the two languages while also taking into account ways in which pronouns were produced in one language, but not the other. The analysis was also done in Elan, with various tiers. Among those tiers and coding options were the following (examples provided in the Results section):

- matching tier (whether one or more pronouns in either language “matches” one or more pronouns in the other language)
  - match, no-match
- match number
  - unique integer for each set of matching pronouns across ASL and English
- no-match analysis (reasons for a lack of a match of pronouns across languages)
  - ASL pronoun, no English match
    - complete reference in English
    - info omitted in English
    - point to visual aid
    - determiner
    - other
  - English pronoun, no ASL match
    - overt pronoun in English (null in ASL)
    - anaphor for target language antecedent
    - adding information/context
    - demonstrative, not in ASL
    - demonstrative determiner, not in ASL

If a pronoun in the ASL production matched one or more semantically and contextually-equivalent pronouns in the English production, each of those pronouns would be coded as a match. These pronouns would be given the same linking-block number. If a pronoun in either the ASL or English productions did not align semantically with a pronoun in the other

---

<sup>6</sup> In most cases, pronouns were produced as expected (e.g., third person singular pronouns were directed laterally -to the right or left – in the signing space), although there was great variation in phonological form that is beyond the scope of the present analysis. The benefit of reviewing each point multiple times and assigning features (e.g., first, second, third, singular, plural, etc.) that matched with aspects of discourse (e.g., who or what was being discussed at any point in time) allowed us to make judgments that were not solely based on phonetic/phonological features.

language, it would be coded as a “non-match.” In addition, each case of non-match was examined in order to determine what reason(s) may have caused the lack of equivalence across languages. In such cases, the options for coding differed for ASL (the source language, or SL) and English (the target language, or TL). If an ASL pronoun did not have an English equivalent pronoun, the coder would choose from among the following options: complete reference in English, info omitted in English, point to visual aid, determiner, other. The other category was used to document tokens that did not align with previously identified categories, and the items in the other category were carefully scrutinized. Similarly, if an English pronoun could not be matched with a semantically equivalent pronoun in ASL, the coder would choose from among the following options: overt pronoun in English (null in ASL), anaphor for target language antecedent, adding information/context, demonstrative not in ASL, demonstrative determiner not in ASL. Select examples are provided in the Results section.

## RESULTS

Quantitative results of the analysis are shown following examples of pronoun matches and non-matches across languages.

### RESULTS: EXAMPLES FROM THE DATA SET

Two examples of pronoun matches across the two languages are captured in segments (1) and (2) below. Segment (1) shows an example of a single ASL pronoun matching a single English pronoun, whereas segment (2) provides an example of a single ASL pronoun matching more than one English pronoun. In both cases, these segments are representative of pronouns with semantic equivalents across SL and TL, and they were coded as matches. Pronoun matches are represented in boldface font.

(1) ASL: (well) OBVIOUS **IX-1sg** EAR HEAR TEST FAIL **IX-1sg** WILL<sup>7</sup>

ENGLISH: Obviously, **I'm** Deaf, so **I'd** fail a hearing test.

(2) ASL: (well) SINCE **IX-1sg** GROW-UP ALWAYS WANT JOIN MILITARY ALWAYS HAVE (well)

English: **I** thought the same thing ever since **I** was young.

As noted in the Methodology section, there are different explanations for non-matching pronouns across the two languages. The ASL coding showed that one reason for not having a matching English pronoun was the interpreter's use of a full noun phrase (e.g., “the man”) in place of a pronominal demonstrative point produced by the signer. Two examples are shown in segment (3), with the ASL points and English full noun phrases appearing in bold font. Whereas these examples were coded as non-matches in the dataset (for the purposes of

---

<sup>7</sup> Pronouns are transcribed using “IX” as an abbreviation for ‘index’. Person is designated as “1”, “2”, or “3”. Singular and Plural appear as “sg” and “pl”, respectively. A point to visual aids by the presenter is indicated with a “IX-point to screen.”

understanding pronouns across the SL and TL), they could still be analyzed as accurate (i.e., functionally-equivalent) interpretations.

- (3) ASL: (well) **IX-point to screen** SEE SOLDIER MEET **IX-point to screen** WITH P-M B-E-G-I-N IN ISRAEL **IX-point to screen**.

English: **The top picture** is of one soldier I met, **the bottom photo** is of Prime Minister Begin with a Deaf soldier in Israel.

Throughout the English coding, a common reason for not having a pronoun match in ASL was due to the use of null pronouns in ASL. In segment (4), it is clear that the interpreter is providing an overt pronoun in English for the null pronominal equivalent in ASL.

- (4) ASL: (well) NOW ALLOWED. WOMEN, ILLEGAL, NOW ALLOWED

English: Women, as well, were banned but now **they've** been allowed.

The final example, given in segment (5), is another common type of non-match pronoun found in the English data, namely *adding information/context*.

- (5) ASL: W-O-W SEE-ME IX-1sg AS PERSON.

English: "Wow, he's viewing me like any person, giving dignity to who **I** am."

## RESULTS: ALL DATA

Analysis of the 18.5-minute video yielded a dataset of 840 pronouns in total, with 387 being ASL pronouns and 453 being English pronouns produced by the interpreter (see Figure 1). In both languages, personal pronouns appeared with considerable frequency in comparison with demonstratives and other types of pronouns. Approximately 98 more personal pronouns appeared in the English interpretation than in the ASL production. One reason for this difference likely lies in a key grammatical difference between the two languages: ASL is a pro-drop language whereas English is not. However, it is also notable that more demonstrative pronouns were produced in ASL (n=92) than in the resulting English interpretation (n=43). This suggests that the interpreter did not always produce a demonstrative pronoun when the signer used one. In the category "Other", there were more English pronouns (n=37) than ASL pronouns (n=20) represented. As noted in the footnote, this category included reflexive, relative, and indefinite pronouns in English; fewer of these types of pronouns were represented in the ASL data.

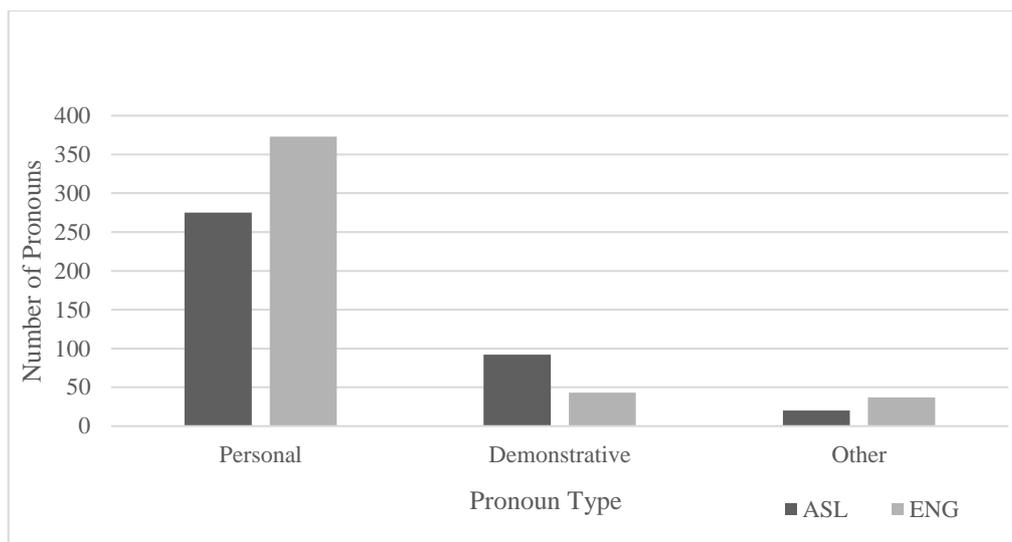


Figure 1. Pronoun distribution in the dataset.

The majority of personal pronouns produced in each language could be matched with one or more semantically-equivalent pronouns in the other language (see Table 1). More than three-quarters of personal pronouns in the ASL production were interpreted to semantically-equivalent matches in English. However, only a slight majority of English pronouns (nearly 52%) had semantic pronominal matches in the ASL production. As noted earlier, one likely reason for this difference is that English is not a language in which pronouns can be null (i.e., not overtly realized), which means that there would be more pronouns appearing in the English data, simply for grammatical reasons.

Demonstratives, on the other hand, were often not represented with semantically-equivalent pairs across the two languages. In fact, nearly 70% of ASL demonstrative pronouns produced were not matched in English. Data from the “Other” category of pronouns are also represented in Table 1, although such pronouns comprise a relatively small portion of the entire dataset.

Table 1: Pronoun Distribution Following Match Analysis

Language	Personal		Demonstrative		Other	
	ASL	ENG	ASL	ENG	ASL	ENG
Match	211 (76.7%)	193 (51.7%)	31 (31.9%)	18 (41.9%)	8 (40.0%)	15 (40.5%)
No Match	59 (21.5%)	178 (47.7%)	64 (65.9%)	24 (55.8%)	10 (50.0%)	20 (54.0%)
No Analysis	5 (1.8%)	2 (0.5%)	2 (2.1%)	1 (2.3%)	2 (10.0%)	2 (5.4%)
Total	275	373	97	43	20	37

Figure 2 and Figure 3 capture the same information as contained in Table 1, although with a different visual depiction.

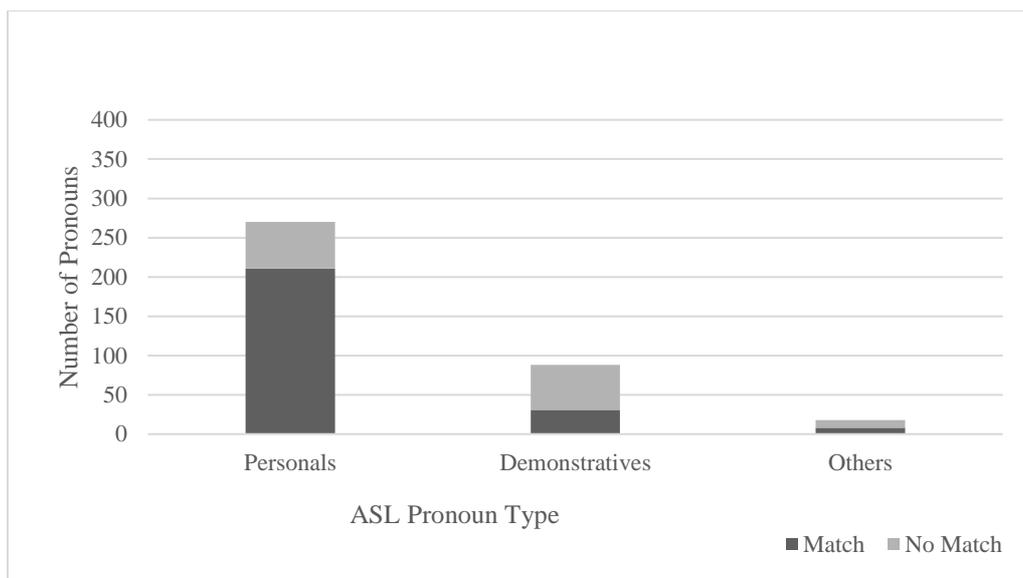


Figure 2. ASL pronouns considering pronoun matches in the English interpretation.<sup>8</sup>

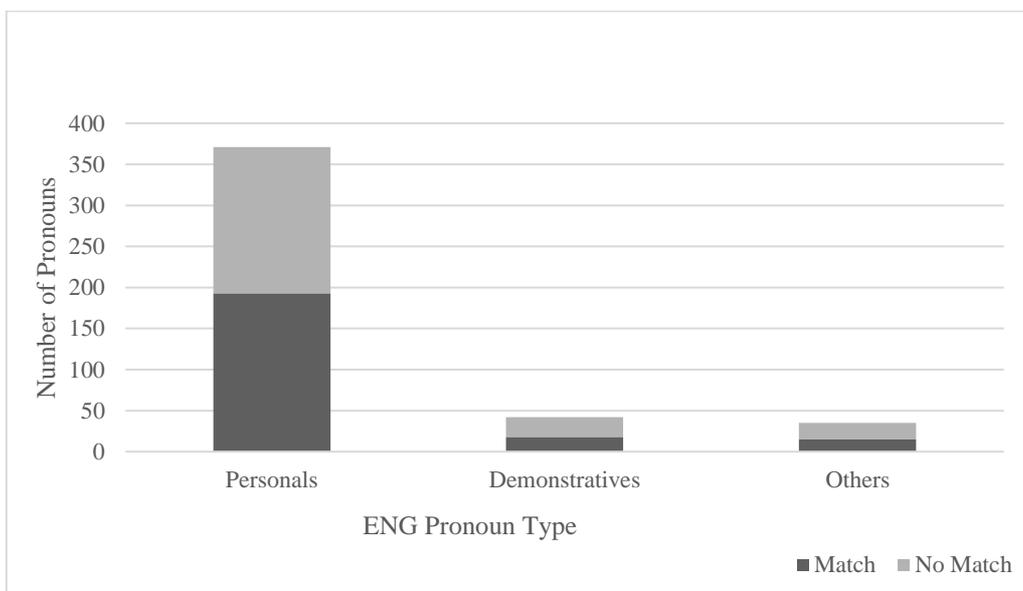


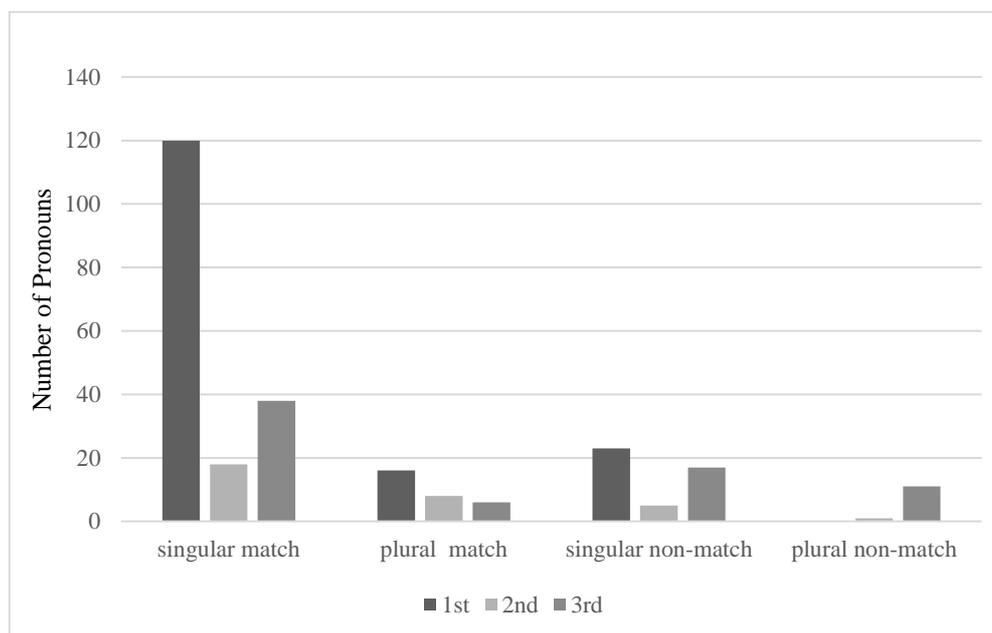
Figure 3. Pronouns in the English interpretation considering matches to ASL pronouns.

Of particular note in Figures 2 & 3 is that there were substantially more personal pronouns in the English production than in the ASL, but many more demonstrative pronouns in the ASL production than in the English.

The matches and non-matches can also be divided according to person and number, and information about the ASL pronouns is contained in Figure 4. The majority of singular points were matched with equivalent pronouns in the TL for first, second, and third person. However, there were also examples of singular points not being matched in the TL. For instance, singular first person points were not matched in English approximately 16% of the time. Of those forms,

<sup>8</sup> Note that the few instances of “no analysis” present in Table 1 were omitted from Figures 2 and 3.

nearly 25% occurred during role-shift constructions.<sup>9</sup> In addition, approximately 45% of all third person singular points were not matched in the TL. Lastly, there were no examples of ASL pronouns in first person plural that were unmatched in English.



*Figure 4.* ASL personal pronouns distributed by matches and non-matches in English interpretation.

The ASL demonstrative pronouns can also be divided by number. There were 26 singular demonstrative matches, compared to 53 singular demonstrative non-matches, a twofold difference. Plural ASL demonstratives appeared with minimal frequency in the data (total  $n=9$ ), totaling five matches and four non-matches. The overwhelming result from this data set was that singular demonstrative points (i.e., the semantic equivalent of ‘that’ and ‘this’) were often not matched with an English demonstrative in the TL.

In order to understand cases where a pronoun was not matched with a comparable pronoun in the other language, the analysis of non-matches required unique categories across the two languages. The percent of non-matches for each category is shown in Table 2 for ASL and Table 3 for English. See the Methodology section for a description of the categories of non-match pronouns in each of the languages.

As can be seen in Table 2, for 51 of the ASL pronouns (38% of all ASL pronoun non-matches), there was no semantically-equivalent information in the English interpretation (whether the information appeared as a pronoun or in some other form). Other common reasons for non-matches included: use of a complete reference in English instead of a pronoun (25% of all ASL pronoun non-matches), and the category “Other” (21% of ASL non-matches).

<sup>9</sup> There were also cases of first singular ASL pronouns that were phonologically reduced. For our purposes, those were forms for which the index finger did not contact the torso. In some of those cases, the handshape did not reach the full target form (e.g., extended index finger). In total 13 of the first person singular non-matches were phonologically reduced, which represents more than half of those non-matches.

Notably, a total of 21 points to a visual aid during the presentation contained no English semantic equivalent (in whatever form).

Table 2: *ASL Non-Match Tokens and Percentages*

No Match Analysis	Number of Occurrences	Percent of Occurrences
Pronominal information omitted in TL	51	38%
Complete reference in TL	33	25%
Other	28	21%
Point to visual aid	21	16%
Total	133	100%

The non-match analysis differs when looking at what English pronouns were produced that did not have equivalent pronouns in ASL. As can be seen in Table 3, the main reason for non-matching pronouns across ASL and English had to do with English requiring pronouns in subject and object position, where ASL is more flexible with the use of null pronouns in subject position. Over 125 pronouns in the English data did not have a semantic match in ASL, and these non-matches can be attributed to a grammatical difference across the languages. However, another common reason for having a pronoun in English that was not matched in ASL was because of added information or context.

Table 3: *English Non-match Tokens and Percentages*

Analysis	Number of Occurrences	Percent of Occurrences
Add TL Overt Pronoun (Null in SL)	124	55.8%
Adding info/context	68	30.6%
Anaphor for TL antecedent	15	6.7%
Demonstrative, not in SL	11	5.0%
Other	4	1.8%
Total	222	100%

## DISCUSSION

### GENERAL FINDINGS

This study provides evidence that grammatical differences across languages can have an impact on simultaneous interpretation between those languages. In the present study, carefully-coded examples of pronouns from the interpretation of a signed language (ASL, the Source Language

[SL]) into a spoken language (English, the Target Language [TL]) provide data for a detailed look at the complexity of pronominal systems and the challenges they pose for simultaneous interpretation. Even in cases where a presentation is presumably rehearsed and an interpreter is prepared for the content and structure of a presentation, there may still exist a notable number of mismatches between the pronominal information contained in the source language and in the target language, even though semantic equivalence is reached.

Semantic equivalence was reached for the majority of pronominal data from the present study, and personal pronouns were generally matched more reliably than demonstrative pronouns (this matter is discussed below). High percentages of pronoun matches were found for examples where unique pronouns in the SL were matched with one or more unique pronouns in the TL. However, what were coded as pronominal “non-matches” for the purposes of this study still achieved a high degree of semantic, or functional, equivalence when taking into account grammatical differences between the two languages. ASL is a pro-drop language, which means that overt subject pronouns are not required (and, depending on the morphological characteristics of the verb, an overt pronoun may be ungrammatical). Accordingly, there are many non-matches in the English personal pronouns produced by the interpreter, and over half of all those pronouns were examples of overt pronouns in English when a pronoun was not needed (or simply not used) in ASL. While this result may seem to mirror that of Sridhar et al. (2013) (more pronoun use in the TL over the SL), their analysis of Spanish-English interpretations does not take into account Spanish as a pro-drop language (i.e., the use of null pronouns in Spanish). As such, it is not clear if the similar result is due to pro-drop characteristics of the SL or, as Sridhar and colleagues might suggest, efficiency of pronoun use in the TL (in other words, that it takes less time to say the pronoun versus the full form).

The dataset made it clear that there were times (n=33) the interpreter would produce a full noun phrase in English (e.g., “the cadet”) when the signer had used a pronominal point (e.g., IX-3sg), which still resulted in an accurate (i.e., functionally equivalent) interpretation, yet did not match the pronoun use across languages. These examples do not support the Sridhar et al (2013) hypothesis of pronoun use for efficiency purposes, but rather speak to the Seleskovitch (1977) premise that meaning is ultimately what should be considered over form. Perhaps the interpreter, in these cases, felt it necessary to be explicit about the nominal form being mentioned, so the full form was used instead of the pronoun from the SL.

Considering the examples summarized thus far, more than 80% of the pronouns in each of the languages can be linked to some type of semantically-equivalent construction in the other language – whether or not the matching construction is a pronoun; that is, whether or not there is matching grammatical form. This is notable and shows that even with differing pronominal systems, simultaneous interpreters can gain a high degree of accuracy in delivering semantically equivalent content. This also speaks to the interpreter’s overall goal of interpreting meaning over form.

## REVISITING HYPOTHESES

The first hypothesis, that interpretation of signed language pronouns should be highly reliable for first person singular and plural pronouns, was generally supported with the data.<sup>10</sup> First

---

<sup>10</sup> Since we did not perform significance testing on the data (see Limitations section), our method for assuming confirmation or non-confirmation of any hypothesis lies in a mix of reporting percentages (e.g., what occurred the majority or minority of the time) and reporting qualitative analysis of each pronoun use (e.g., such as whether it occurred within a role-shift, etc.).

person singular forms were accurately matched nearly 85% of the time, and first person plural forms were always matched. As suggested, it may be that the relatively stable phonological form of these pronouns support accurate interpretations in the TL with semantically-equivalent pronouns. However, as noted in footnote 2, there were many times that such forms were phonetically reduced, yet still interpreted accurately. Unlike non-first forms (second and third person), the referent of first person forms is relatively unambiguous, except in tokens that represent a role-shift to another character (or to the signer in character). In the current dataset, nearly 25% of the ASL first person-singular pronouns that were not matched in the TL were during role-shift constructions. As such, while role-shifting may play a role in the accuracy of pronoun interpretation, it did not appear to cause difficulty for the interpreter at this interpreted event.

The second hypothesis, that interpretation of signed language pronouns should be highly reliable for third person singular pronouns (because of referential specificity), did not seem to be supported by the data. In particular, there were comparatively more non-matches for second and third person forms (than first person forms), and that was particularly true for third person pronouns.<sup>11</sup> For singular pronouns, third person non-matches comprised approximately 31% of all third person forms (compared with 16% for first person non-matches). Additionally, third person plural non-matches were the only type of non-matches in the plural category. Clearly, third person forms are more challenging for interpretation, which does not support the hypothesis that they would be robustly interpreted because of the benefits of *referential specificity*. With this in mind, what might be at play? We suggest that demonstratives are the source of the challenge, due to their ambiguity (a singular demonstrative and a singular second or third person form might have the same form. We provide further details below.

Our third hypothesis, that interpretation of signed language pronouns should not be highly reliable for points that serve as demonstratives, determiners, location points, etc. (because of ambiguity of such points), was confirmed with the data. Singular demonstratives were not matched with TL demonstrative pronouns as often as they were matched. Over 50 tokens of such non-matches appeared within the data, which represents more than half of the demonstrative points in the SL. These data support our third hypothesis, which suggested that demonstrative points would be homophonous with personal pronoun points. This was particularly true for singular points in this data set, as there were only a few examples of plural demonstratives to show if the same pattern might hold. As noted earlier, a single point to a lateral location can be highly ambiguous (e.g., third person singular, demonstrative, locative), and this can significantly affect interpretation. Koulidobrova and Lillo-Martin (2016) suggested that personal pronouns can be better interpreted as demonstratives, and the data from our study may provide some independent information about such an analysis.

It may be the case that ambiguity of third person pronouns and demonstratives leads to challenges with simultaneous interpretation. There were a notable number of non-matches in the ASL third person singular category and the ASL singular demonstrative category. As noted earlier, this disproved our hypothesis that the referential specificity of third person points would support robust and accurate interpretation. However, based on what is known about singular demonstratives, it makes sense that singular demonstratives and third person singulars are confusable. The same may be true for plural forms, although there were fewer examples of

---

<sup>11</sup> There are notably fewer second person pronouns (singular and plural) in the dataset (total n=32), which makes it difficult to use such forms as evidence for support of (or evidence against) our hypotheses.

third person plural forms and plural demonstratives within this dataset. As such, our hypothesis about referential specificity supporting accurate pronoun interpretation in simultaneous interpretation was not supported.

## CONSIDERING MISMATCHES

Analysis of the mismatched pronouns across the two languages can provide insight into challenges of differing grammatical systems during simultaneous interpretation. ASL pronouns that are not matched with semantically-equivalent pronouns in the English interpretation are discussed first, followed by English pronouns in the interpretation that are not matched with a corresponding pronoun in the ASL production.

Approximately one-third of the pronouns produced in ASL were not matched with equivalent pronouns in English. However, that does not mean that a successful interpretation was not produced one-third of the time. Of the one-third (n=133), nearly one-fourth (n~33) of the non-matches in English were accurate interpretations that contained full references (i.e., full noun phrases) instead of pronouns. The use of a full reference can serve to disambiguate pronouns produced in the SL. Additionally, a full reference in English may be necessary if the referent had not been mentioned recently in discourse.

There were, however, two categories for non-matched ASL pronouns that speak to the challenges with pronominal systems across this language pair. Those categories are *pronominal information omitted in TL* and *point to visual aid*. The former is addressed first since it comprised the majority of non-matches for the ASL pronominal analysis. The category *pronominal information omitted in TL* provides evidence that a simultaneous interpretation is challenging and errors of omission can be made—even by the experienced interpreter who presumably had the opportunity to prepare with presenter materials and, possibly, to rehearse the presentation. Errors could be caused by memory constraints, complex grammatical constructions, or decreased attention due to cognitive fatigue, among other reasons. We recognize that some omissions are strategic, as has been suggested by Napier (2004). Unfortunately, an analysis of the omissions, with the goal of classifying them according to the taxonomy set forth by Napier, was beyond the scope of this study. Such an analysis will have to await future work on the topic.

Regarding the second most frequent type of non-match for the SL, it is apparent that a referential point to a visual aid can be ambiguous, which presents a challenge for the interpreter. For example, if a presentation slide with an image of two people and accompanying text is shown, the presenter's point to the slide might be interpreted as: "The slide," "That person/woman/man on the right," "This bullet point/text," "She/he," or "That/this/there," among other options. In short, a *point to visual aid* can be interpreted as a personal or demonstrative pronoun or even a definite determiner. In addition, since there is typically a lag time from when the *point to visual aid* is produced to when the interpreter is able to utter a semantic equivalent for that reference, the interpreter might feel that it is confusing to produce a construction that needs the visual aid for support. In such cases, the SL *point to visual aid* might not contain a TL equivalent; this occurred in 21 tokens within this dataset. Interestingly, co-speech gesture researchers have noted that pointing can disambiguate segments of speech, but the timing of the manual gesture in relation with the speech is particularly important (McNeill, 1992); generally, the manual point and the speech reference (e.g., demonstrative

pronoun “that”) co-occur.<sup>12</sup> Keeping in mind these challenges of interpreting a *point to visual aid*, there were also times that the English interpretation in this data set contained a semantic equivalent (whether the semantic equivalent was a full noun phrase, a demonstrative pronoun, or deictic words such as “here” or “there”). Those matches are captured under the category demonstrative matches.

Approximately one-third of the pronouns produced in English were not matched with equivalent pronouns in ASL. As was noted above, this does not mean that a successful interpretation was not produced. A large proportion (over 50%) of the English non-matches (i.e., produced English pronouns that did not have an equivalent pronoun in the ASL production) were due to the use of a full reference in English (examples were discussed earlier). The next largest category of non-matches is *adding info/context*. Depending on the analysis, these examples could be errors of omission (i.e., information that was not in the SL) or else strategies that the interpreter used to make the SL message sound more natural in the TL. Regarding the latter, some researchers have referred to such strategies as *expansion techniques* (Finton & Smith, 2005), noting that interpretation is not simply transliteration of the SL, but rather complex creation of parallel meaning in the TL that may differ in grammatical form and lexical items from the original. Further analysis of such techniques is beyond the scope of this work, but we suggest that they provide an intriguing theory that should be addressed in future work. The other categories of non-matches (anaphor for TL antecedent, demonstrative not in SL, other) collectively represent less than 13% of all non-matches. We feel that they are important to report, but they constitute the vast minority of English pronouns that are not matched in ASL. The primary reasons for producing English pronouns that do not have exact pronominal matches in ASL are either grammatical constraints (e.g., pro-drop in ASL, not in English) or else interpreter omissions.

If we consider all the ASL pronouns not matched in the English interpretation and all the English pronouns not matched in the ASL production, and we remove those that contain a semantically-similar construction in the other language, there remain a combined 16% that reflect inaccurate or incomplete interpretation. These categories include: *pronominal information omitted in the TL* (ASL), *point to visual* (ASL), and *adding info/context* (English). It is not surprising that these examples which lack functional (semantic) equivalence still exist, given evidence of grammatical differences having an impact on interpretation (e.g. Zhan, 2014) and omissions being a common source of cohesion shift among developing interpreters (Shlesinger, 1995). We speculate that the interpreter working with the Deaf man who delivered the TedX talk was able to rehearse the interpretation (since that is common in high-profile interpreting of this nature), and she was familiar with the narrative. If that is true, the rehearsal may have helped the interpretation greatly, in terms of pronoun matches and other semantically equivalent content. Yet there still remains a small, albeit notable, percentage of mismatches with no functional equivalence across languages. We feel that this speaks to the challenges of grammatical differences across pronominal systems.

In summary, the hypothesis that first person pronouns tend to be robustly interpreted was generally accurate, but the same may not be true for non-first person forms (specifically, third person forms). In addition, demonstrative points appear particularly challenging,

---

<sup>12</sup> Of course, gestural points are also used by presenters who are using spoken language. Because of this, we predict that such points and accompanying demonstratives would also be challenging for spoken language simultaneous interpretation, especially because of influences of lag time.

especially those used for singular referents. These data highlight the ambiguous nature of pointing in a signed language, which can provide challenges for simultaneous interpretation.

### IMPLICATIONS

The data from this work has multiple implications for the work in which interpreters engage on a regular basis. First, grammatical differences across languages can provide challenges for simultaneous interpretation because the interpreter must quickly make decisions about how to represent information that may be implicit (e.g., null pronouns), ambiguous (e.g., a non-first personal pronoun versus a demonstrative pronoun), or underspecified for a specific feature (e.g., gender of a third person referent). This premise aligns with previous studies that suggest grammar can be analyzed to understand interpreter performance (Shlesinger, 1995; Takimoto & Koshiba, 2009; Zhen, 2014). This concern with grammar is not necessarily in opposition to writings that suggest meaning should be the focus over form, (e.g., Seleskovitch, 1977), but rather as a complement to understanding the impact of language features on interpretation. The importance of understanding pronominal frameworks and adapting target messages within an interpretation is key to performing accurate interpretations. We suggest that working interpreters and interpreting students be made aware of such challenges in order to prepare themselves with strategies for interpreting such forms. Educational programs and skills-development workshops could benefit from including information about pronominal systems along with the results from this study in an effort to make interpreters more aware of the challenges that pronominal systems pose for simultaneous interpretation.

### LIMITATIONS

There are multiple limitations of this study, which should be noted. First, the analysis concerns a single interpreted setting, which limits the degree to which the results are generalizable to other interpreted events that are similar in nature. Second, for this study we did not provide an independent measure of the quality of the interpretation. Rather, as noted in our Methodology section, we made efforts to obtain information about the interpreter's credentials, although we were unsuccessful. As previously noted, both the first and second authors of this work are certified interpreters, and believe that the interpretation quality is extremely high. We speculate that the interpretation was rehearsed. The results could be vastly different (with less functional equivalence between the SL and TL in respect to pronoun use) with unrehearsed work. Analyzing additional interpreted events (of other interpreters or of the same interpreter) was beyond the scope of this research study. Third, we do not provide significance testing for our data. Rather, we only report raw numbers and percentages of tokens (see footnote 9). This analysis can then be characterized as a case study of sorts, since it focuses on a single interpreted event. While case study research does allow for significance testing (see Crawford and Howell [1998] for the t-distribution method for estimating the atypicality of a response), case study data are usually compared to (expected) group means. To our knowledge, there exist no other analyses that are similar, and comparison data do not exist. We hope to remedy this last limitation with future analyses that compare the current findings with those from other interpreted events (and other interpreters). Finally, this study does not provide an in-depth analysis of omissions (e.g., ASL pronouns that were not matched in the English interpretation, either in form or with functional/semantic equivalence), such as what has been done in the past by Napier (2004). We hope to conduct such an analysis with future work on the topic.

## CONCLUSION

Signed language pronominal systems are complex and they pose particular challenges for simultaneous interpretation. This has been shown with data from a TEDx talk given by a Deaf user of ASL. Data from the presentation, along with data from the simultaneous interpretation into English were coded and scrutinized for semantic correspondence across languages. We have shown that simultaneous interpretation can be accurate, in general terms, in a majority of the cases with respect to pronominal systems, but errors regarding non-matches across languages provide information about challenging aspects of those systems. In particular, we suggest that the ambiguous nature of some forms (especially third person pronouns and singular demonstratives) can cause difficulties during interpretation.

## ACKNOWLEDGMENTS

We would like to thank University of Texas Signed Language Research Lab members who worked on this study, including Christian Barthlow, Chloe Gomez, Lauren Kelley, Marcus Martinez, Phoebe Mintz, Emily Saunders, Madison Stacey, Kathryn Whitley, and Roxanne Zech. In addition, Kierstin Muroski played a key role in ASL data coding and a conference presentation at Gallaudet University. We thank the attendees at the Second Symposium on Signed Language Interpretation and Translation Research and two anonymous reviewers of this journal for their comments and suggestions. Any errors or oversights are, of course, our own.

## REFERENCES

- Bybee, J., File-Muriel, R.J., & Napoleão de Souza, N. (2016). Special reduction: a usage-based approach. *Language and Cognition*, 8, 421-446. doi:10.1017/langcog.2016.19
- Crasborn, O. & Sloetjes, H. (2008). Enhanced ELAN functionality for sign language corpora. In *Proceedings of LREC 2008, Sixth International Conference on Language Resources and Evaluation*.
- Crawford, J. R., & Howell, D. C. (1998). Comparing an individual's test score against norms derived from small samples. *The Clinical Neuropsychologist*, 12, 482 – 486.
- Finton, L., & Smith, R. (2005). Compression strategies: ASL to English interpreting. *Journal of Interpretation*, 49-63.
- Fu, R. (2016). Comparing modal patterns in Chinese-English interpreted and translated discourses in diplomatic setting. *Babel*, 62, 104-121.
- Gernsbacher, M.A., & Shlesinger, M. (1997). The proposed role of suppression in simultaneous interpretation. *Interpreting (Amst)*, 2, 119-140.
- Jaffe, A. (2009). The Sociolinguistics of Stance. In: A. Jaffe (Ed.), *Stance: Sociolinguistic Perspectives*. (pp. 3-28). New York: Oxford University Press.
- Kärkkäinen, E. (2006). Stance taking in conversation: From subjectivity to intersubjectivity. *Text and Talk*, 26. 699-731.
- Koulidobrova, E., & Lillo-Martin, D. (2016). A 'point' of inquiry: The case of the (non-)pronominal IX in ASL. In P. Grosz & P. Patel-Grosz, *The Impact of Pronominal Form on Interpretation*. (pp. 221-250). Berlin: de Gruyter Mouton.
- Liddell, S., & Metzger, M., (1998). Gesture in sign language discourse. *Journal of Pragmatics* 30, 657–697.
- Lillo-Martin, D. (1991). *Universal Grammar and American Sign Language: Setting the Null Argument Parameters*. Boston: Kluwer.
- Lillo-Martin, D., & Meier, R. (2011). On the Linguistic Status of 'Agreement' in Sign Languages. *Theoretical Linguistics*, 37, 95-141.
- Mayberry, R., Hall, M. Zvaigzne, (2013). & Subjective frequency ratings for 432 ASL signs. *Behavioral Research*. DOI 10.3758/s13428-013-0370-x.
- McBurney, S.L. (2002). Pronominal reference in signed and spoken language: Are grammatical categories modality-dependent? In R.P. Meier, K. Cormier, & D. Quinto-Pozos, *Modality and structure in signed and spoken languages*. (pp. 329-369). Cambridge: Cambridge University Press.
- McNeill, D., (1992). *Hand and Mind: What Gestures Reveal About Thought*. University of Chicago Press, Chicago.

- Metzger, M., (1995). Constructed dialogue and constructed action in American Sign Language. In: Lucas, C. (Ed.), *Sociolinguistics in Deaf Communities*. (pp. 255–271). Gallaudet University Press, Washington, DC.
- Metzger, M. (1999). *Sign language interpreting: Deconstructing the myth of neutrality*. Washington, D.C.: Gallaudet University Press.
- Morford, J.P., & MacFarlane, J., (2003). Frequency characteristics of American Sign Language. *Sign Language Studies*, 3, 213-225.
- Napier, J. (2002). University interpreting: Linguistic issues for consideration. *Journal of Deaf Studies & Deaf Education*, 7, 281-301.
- Napier, J. (2004). Interpreting omissions: A new perspective. *Interpreting*, 6, 117-142.
- Pereira, M.C.P. (2014). A interpretação interlíngua da Libras para o Português Brasileiro: Um estudo sobre as formas de tratamento. (The interlingual interpretation of Libras to Brazilian Portuguese: A study about forms of address.) Unpublished doctoral dissertation. Universidade Federal de Santa Catarina.
- Quinto-Pozos, D., Alley, E., Casanova de Canales, K., & Treviño, R. (2015). When a language is underspecified for particular linguistic features: Spanish-ASL-English interpreters' decisions in mock VRS calls. In B. Nicodemus & K. Cagle (Eds.), *Proceedings of the International Symposium on Signed Language Interpretation and Translation Research* (pp. 212-234). Washington, DC: Gallaudet University Press.
- Sandler, W., & Lillo-Martin, D. (2006). *Sign language and linguistic universals*. Cambridge: Cambridge University Press.
- Seleskovich, D. (1977). "Take care of the sense and the sounds will take care of themselves or Why Interpreting is not tantamount to Translating Languages", *The Incorporated Linguist*, London, Vol. 16, 27–33.
- Shlesinger, M. (1995). Shifts in cohesion in simultaneous interpreting. *The Translator*, 1, 193-214.
- Shlesinger, M. (1995). Stranger in paradigms: What lies ahead for simultaneous interpreting research? *Target*, 7, 7-28.
- Sridhar, V.K.R., Chen, J., & Bangalore, S. (2013). Corpus analysis of simultaneous interpreting data for improving real time speech translation. *Interspeech 2013*. 3468-3472.
- Takimoto, M. & Koshiba, K. (2009). Shift in footing in a multi-party interpreting situation: The choice of pronouns by an interpreter and its effects. *Monash University Linguistics Papers*, 2. 1-9.
- Timarová, Š., Čeňková, I., Meylaerts, R., Hertog, E., Szmalec, A., & Duyck, W. (2014). Simultaneous interpreting and working memory control. *Interpreting*, 16, 139-168.

- Wang, J. (2016). The relationship between working memory capacity and simultaneous interpreting performance. *Interpreting, 18*, 1-33.
- Wang, M. (2014). The impact of grammatical differences on Mandarin Chinese-English simultaneous interpreting. Unpublished doctoral dissertation. University of Leicester.
- Zhan, C. (2012). Mediation through personal pronoun shifts in dialogue interpreting of political meetings. *Interpreting, 14*, 192-216.

## APPENDIX

Table 4: Key Linguistic Terms

Term	Informal definition	Example
anaphor	a word that refers back to a word or expression that appeared earlier	John was tired because <i>he</i> hadn't slept. 'He' is the anaphor for 'John'.
antecedent	a word or expression that serves as the source of meaning for a word or expression that appears later	<i>The woman</i> was walking while she listened to the audio book. 'The woman' is the antecedent of 'she'.
demonstrative pronoun	a pronoun that refers to something in space or in time	I like <i>that</i> . She was popular <i>then</i> .
determiner/ demonstrative determiner	a word that combines with a noun to provides information about definiteness (e.g., a particular noun vs. a non-particular noun), reference to something in space, etc.; not strictly an adjective	English definite determiner: <i>the</i> car English indefinite determiner: <i>a</i> bird English demonstrative determiner: <i>that</i> car
pro-drop construction	the omission of a pronoun, typically because the pronominal information is inferable from pragmatic context or from the verb form	Spanish: $\emptyset$ tengo hambre $\emptyset$ have (1sg) hunger "I'm hungry."