

Linguistic insights on interpreting to international sign (IS)

IS produced by interpreters: evidence for a language-like system



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Nana Gassa Gonga

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Linguistic insights on interpreting to international sign (IS)

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evidence for a language-like system**

Aurélia Armelle Nana Gassa Gongu

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Aurélia Armelle Nana Gassa Gongu

Promotor:

Prof. dr. Onno Crasborn

Copromotor:

Dr. Ellen Ormel

Manuscriptcommissie:

Prof. dr. Marc van Oostendorp

Prof. dr. Jemina Napier (Herriot-Watt University, Verenigd Koninkrijk)

Prof. dr. Christian Rathmann (Humboldt-Universität Zu Berlin, Duitsland)

Dr. Lori Whynot (Northeastern University, Verenigde Staten)

Dr. Florence Encrevé (Université Paris 8, Frankrijk)

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evidence for a language-like system**

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Aurélia Armelle Nana Gassa Gongu

PhD supervisor:

Prof. dr. Onno Crasborn

PhD co-supervisor:

Dr. Ellen Ormel

Manuscript Committee:

Prof. dr. Marc van Oostendorp

Prof. dr. Jemina Napier (Herriot-Watt University, United Kingdom)

Prof. dr. Christian Rathmann (Humboldt University of Berlin, Germany)

Dr. Lori Whynot (Northeastern University, United States)

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Terms

- ASL: American Sign Language
- Auslan: Australian Sign Language
- BSL: British Sign Language
- CSL: Chinese Sign Language
- ISL: Irish Sign Language
- LIS: Italian Sign Language
- LSF: French Sign Language
- LSFB: French Belgium Sign Language
- MSL: Mexican Sign Language
- NGT: Sign Language of the Netherlands/Dutch Sign Language
- NZSL: New Zealand Sign Language
- SSL: Swedish Sign Language
- VGT: Flemish Sign Language

Organizations and conferences

- CISS: International Committee of Sports for the Deaf
- efsli: European Forum of Sign Language Interpreters
- TISLR: Theoretical Issues in the Study of Sign Languages
- WASLI: World Association of Sign Language Interpreters
- WFD: World Federation of the Deaf

Annotators

- AN: Aurélia Nana Gassa Gongu, author of the PhD dissertation (hearing)
- EO: Ellen Ormel, assistant professor and PhD supervisor (hearing)
- OC: Onno Crasborn, professor and PhD supervisor (hearing)
- TU: Tom Uittenbogert, research assistant (deaf)



Chapter 1

General introduction

The International Sign maxim is: don't tell it, show it

(Moody, 2002, p. 36)

Introduction and positionality

When hearing people meet and have no native language in common, they are most likely to use English to communicate with each other. A 'lingua franca' is the name given to this shared language (English in this case) in an international context (Seidlhofer, 2013). But what about deaf people; what language do they use with their foreign interlocutors? When deaf people meet and do not share the same native sign language, they have no sign lingua franca to fall back on. To date, there is no consensus for one national sign language that acts as a lingua franca, even though ASL is increasingly used as such (Kusters, 2021a). Yet, thanks to a marvellous skill termed *international sign* (IS), deaf people can communicate even when they do not know any ASL (Crasborn & Hiddinga, 2015). IS is thus sometimes also referred to as the lingua franca for this group (Kusters, 2024).

International sign is a form of signed communication that arises spontaneously when deaf people from different linguistic backgrounds come together. It is not a standardized or formalized sign language; it is an ad-hoc, visual-gestural system that draws upon shared spoken language gestures, lexical signs, elements of iconicity, and mutual understanding (Hiddinga & Crasborn, 2011; Supalla & Webb, 1995a; Whynot, 2016). IS, as a mix of different sign languages, tends to be highly adaptable, relying on context, visible cues, and facial expressions to facilitate comprehension across different sign language users, making it an effective tool for cross-linguistic communication in international deaf contexts—even in complex settings like linguistic conferences (Rosenstock, 2004; Supalla & Webb, 1995a; Zeshan, 2015).

The broad question of how communication is possible without a shared language is central to this dissertation. IS provides important insights into this topic. With the growing interest in multilingualism and globalization, the issue of communication without a shared language has increasingly attracted attention from both linguists and anthropologists (Friedner & Kusters, 2015; Rosenstock & Napier, 2015; Whynot, 2016). In recent editions of the *International Journal of Bilingualism* and the *International Journal of Multilingualism*, scholars have discussed how effective communication among hearing individuals is often facilitated by 'receptive multilingualism.' Receptive multilingualism refers to a communication mode in which speakers use their own native or familiar language while understanding the language of their interlocutors, relying primarily on their receptive skills rather than producing

speech in the interlocutor's language (Sağın-Şimşek & König, 2012; ten Thije & Zeevaert, 2007). In this framework, hearing people can communicate across linguistic boundaries while largely retaining their own language structures and forms.¹

However, the story is different for deaf individuals. In cross-signing contexts—where signers from different sign language backgrounds communicate—there is a significant need for adaptation and modification. Deaf signers frequently adjust their signing style, incorporate iconic elements, and adapt to their interlocutor's language system to ensure mutual comprehension (Byun, 2023; Zeshan, 2015). This active accommodation contrasts with the relatively static nature of receptive multilingualism among hearing people and highlights the unique strategies deaf individuals employ in cross-linguistic communication.

In addition to the effect of receptive skills, IS is an advanced form of communicative interaction: deaf individuals, without prior knowledge of another person's sign (or spoken) language can often quickly establish successful communication, with the exchange increasing in complexity and speed over time (Zeshan, 2015). IS therefore forms the key focus of this thesis, in which, more specifically, I explore the use of IS by conference interpreters.

IS is an umbrella term that encompasses different types of communication. Its composition, namely the different types of signs it contains, ranges from less to more conventionalized forms, and this variation depends heavily on the language backgrounds of the participants involved. Three main labels are currently given to the use of IS, depending on its occurrence: Cross-signing, Expository IS, and IS interpreting

First, *cross-signing* is the term used when signers from different national sign language backgrounds negotiate meaning using visual-gestural strategies (see Byun et al., 2018; Zeshan, 2015). These strategies include relying on easily interpretable gestures such as mimicking common actions, using iconic signs that visually represent the concept being discussed, and leveraging facial expressions or body movements to convey meaning. Signers may also point to objects, use space in dynamic ways, or employ basic elements of grammar common to several sign languages to facilitate mutual understanding. Cross-signing involves borrowing elements from different signed languages and

^{1.} Translanguaging theory also related to this phenomenon (Wei, 2018).

utilizing iconic signs or spoken language gestures that are recognizable across linguistic boundaries.

Cross-signing is particularly useful in informal, spontaneous interactions where signers may have no prior experience using IS but can still communicate effectively through shared visual strategies (Zeshan, 2004a). *Cross-signing* interactions are known to have a high degree of flexibility, meaning that the structure of the communication can change dynamically within the same conversation or across different interactions, depending on the participants' language backgrounds and communicative needs. Signers constantly adjust their signing to each other's skills, using more or fewer conventionalized signs or gestures as the interaction progresses. This implies a low degree of conventionalization, where the signing system is not fixed but evolves in real-time.

Interlocutors co-create meaning throughout these exchanges. This means that both participants contribute actively to shaping the conversation, often using trial-and-error methods to clarify misunderstandings. For example, during 'repair sequences'—moments where one participant realizes a misunderstanding has occurred—they may modify their signs or gestures to make their intent clearer, and the other participant responds with signs or gestures that confirm or adjust the intended meaning. This interactive, back-and-forth process is a key feature of cross-signing (see Byun et al., 2018).

Second, *Expository IS* (as coined by Whynot, 2016) refers to a more structured and formal use of IS, often seen in conference settings or presentations (see Monteillard, 2001). It is more conventionalized as the presenter expresses a message in unilateral communication, without co-creating meaning with the audience. However, real-time feedback from the audience can still influence the presenter's message.² For instance, Whynot (2016) observed 63% of conventionalized signs in their datasets of IS presenters. Thus expository IS involves carefully selecting signs that will be broadly understood by an international audience, often relying on iconicity and non-lexical elements to enhance comprehension (Whynot, 2016). This more formal use of IS emphasizes clarity and accessibility for diverse audiences, making it an effective tool in multilingual deaf communication (yet, reception of IS is out of the scope of this dissertation). Figure 1 presents the difference of conventionalization between cross-signing and expository IS.

² E.g. feedback, for example when the presenter sees puzzled faces in the audience.

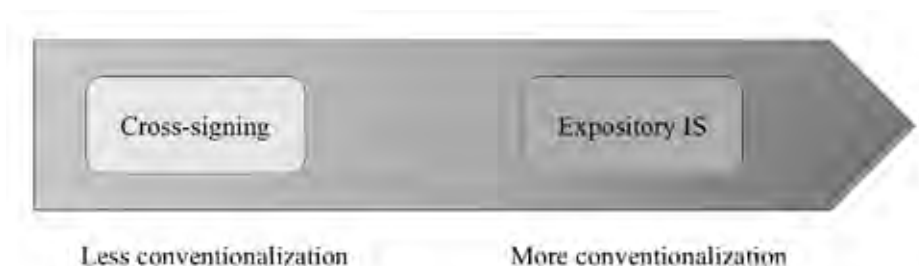


Figure 1. IS continuum depending on its degree of conventionalization

Third, *IS interpreting* refers to the process where deaf or hearing interpreters convey a source message to a target output using IS, which is often spontaneously created- though pre-interpreting assignment preparation has been done- and can vary in its conventionalization. This form of interpreting involves creating a flexible mode of signing that draws upon existing sign languages but adapts to the context and audience in real time, rather than strictly interpreting between two fixed languages (Wit et al., 2021). Concerning IS interpreting, there are no quantitative results observing the use of conventionalized signs. Time constraints may reduce the opportunity for interpreters to innovate or adapt their signing style to a less conventionalized one, leading to more standardized forms of IS. This dissertation will shed light on this.

My research focuses on *IS interpreting* in a specific interpreting setting: conference interpreting by hearing and deaf interpreters. IS interpreting has emerged as a vital communication tool in diverse settings, particularly at global conferences, making communication among deaf individuals from various linguistic backgrounds possible (e.g., for informal interpretation also, see Green, 2015). I have been a practicing hearing conference French Sign Language (LSF) interpreter since 2012, and my inspiration for the subject of IS interpreting arises from the international meetings I have attended.³ One of these recurrent meetings has been the yearly efsli conference. This conference has taken place since 1992 and aims to support European hearing and deaf interpreters by enhancing skills, sharing experiences, and advancing the field of sign language interpretation in Europe. The conference languages are English and the spoken and signed languages in the host countries, with the provision of IS interpreting. This research is thus informed by my dual roles as a practitioner and a researcher, i.e. embodying a practisearcher approach (Gile, 1994; Napier, 2011).

³. For an overview of the History and professionalization of LSF interpreters, see Bernard et al. (2007).

Despite its growing use and significance, IS interpreting remains academically underexplored, with many studies being more than 20 years old (e.g. a dataset from 1995 in McKee and Napier (2002)) or reliant on personal theorizing (an IS interpreter's testimony in Moody (2002)). With this dissertation, I aim to bridge that gap by providing new empirical data and insights into IS interpreting, specifically in comparison with interpreting into a national sign language, in this case Sign Language of the Netherlands (NGT). The research centers on the cognitive processing and linguistic characteristics of IS, shedding light on core questions that have long intrigued linguists and interpreters alike: How are IS utterances composed? Should IS be considered as a full-fledged language, or is it better understood as a pidgin or code-mixing practice? To what extent does IS interpreting differ from national sign language interpreting?

This introductory chapter lays the foundation for the dissertation by discussing the broader context of IS and IS interpreting, mentioning key signed language properties and providing an overview of the main questions and structure of the thesis. It highlights the need for empirical investigation into IS interpreting, particularly regarding its processing time and the use of the linguistic elements available in signed languages (e.g. through the lens of lexical diversity).

Different perspectives on IS

While the three IS types are clear-cut, many authors use IS to refer to any one of the types. Defining IS is thus a complex task as it challenges decades of research on spoken and signed languages. In this section, I start by tracing the origins of IS and continue by referencing one of the most recent definitions of IS. I then discuss misconceptions that need to be avoided and some challenges presented by IS.

The origins of IS can be traced back to modes of communication used by deaf individuals at international gatherings (e.g. in Paris, see Monteillard, 2001 and Kusters, 2024), long before formal codification efforts. As early as 1779, Pierre Desloges described cross-signing practices among Deaf people from various European countries in Paris, where they reportedly communicated without difficulty (Adam, 2012; Rosenstock & Napier, 2016). Much later, the WFD initiated discussions about standardizing a non-national sign language during its first congress in 1951, which eventually led to the formal introduction of what became known as Gestuno.

By 1955, a committee was established to oversee this unification effort. Gestuno offered a set of standardized signs for use at international meetings but was criticized for its lack of natural grammatical structures which made it difficult for signers to use it effectively in real-time conversations (Moody, 2002). Signers, including interpreters, found it challenging to adapt to Gestuno's rigid format, particularly because it lacked the flexibility and fluidity that characterize natural signed languages. Despite the will to codify IS with Gestuno, IS is not a standardized or fully codified language. IS remains a dynamic, context-dependent form of communication that draws from multiple signed languages. IS relies heavily on iconicity (within lexical and non-lexical resources)⁴ and gestures to facilitate understanding, allowing signers from different linguistic backgrounds to communicate more naturally. This makes IS highly adaptable in international settings, such as WFD congresses and Deaflympics, where it is commonly used as a lingua franca (Kusters, 2021c; Moody, 2002; Nilsson, 2020).

Concerning its delimitation, Whynot (2016) defines (all types of) IS as "a form of contact signing used in international settings where people who are deaf attempt to communicate with others who do not share the same conventional, national signed language (NSL). This term has been used broadly to describe a variety of semiotic strategies in multilingual signed language settings, whether in pairs, small groups, or larger communications." (Whynot, 2016, p. 1). Historically, before Stokoe's (1960) foundational work on sign compositionality, it was widely believed that a single, universal gestural language was used by deaf individuals. However, in the decades that followed, research, such as that by Klima and Bellugi (1979), revealed the diversity of sign languages and demonstrated that they are not mutually intelligible. For example, Jordan and Battison's (1976) referential communication experiment, which studied intelligibility between ASL and several other sign languages (Danish, French, Chinese, Italian, and Portuguese sign languages), concluded that signers understand their native language better than unknown languages. This finding directly contradicts the persistent belief in one universal sign language—a notion also unfulfilled by IS.

Additionally, when research shifted from focusing on lexical differences to examining grammatical aspects, it became clear that signed languages share many similarities thanks to their visual-gestural modality (Johnston, 1989; Meier, 2002). This potential is not only evident in the lexicon but also at the

⁴. See section 1.4 "Sign language linguistics elements" below.

sentence and discourse levels, where the visual-gestural modality can be fully exploited, leading to highly iconic non-lexical structures (Cuxac, 2000a). Although some of these structures may have parallels in gesture, their use in signed languages is more systematic and integrated into the grammatical framework. These structures, which often do not have direct equivalents in spoken languages, are key for mutual understanding among signers from different language backgrounds. IS, therefore, builds on these shared grammatical structures to facilitate communication.

Despite similarities across signed languages, each remains a full-fledged language with distinct lexicons and grammars (Sandler & Lillo-Martin, 2006; Zeshan, 2004a, 2004b). Evidence for this comes from the various sign language dictionaries and projects like the EU's SignGram⁵ and the Horizon 2020 project SignHub,⁶ both of which aim to document and produce grammars for multiple European sign languages. This raises important questions, like whether IS does or does not have its own lexicon and grammar. This dissertation aims to provide insight into the use of IS by both hearing and deaf interpreters.

Furthermore, IS differs from spoken languages in terms of language distances and historical relationships between sign languages. In spoken languages, mutual intelligibility often arises from familial connections (e.g., Gooskens et al. (2008) for Scandinavian languages). Similarly, some sign languages share historical ties. For example, McKee and Kennedy (2000) describe the relationship between BSL, Auslan, and NZSL, which share a common heritage due to colonial influences. When historical links between sign languages do exist, they are usually identified through lexical similarities. For instance, Aldersson and McEntee-Atalianis (2007) demonstrated lexical overlap between Icelandic and Danish sign languages, which share historical ties.

However, not all sign languages have these kinds of historical connections. Börstell et al., (2020) examined linguistic distance between NGT, CSL, and IS, highlighting that similarities may occur due to other linguistic factors rather than shared historical roots. The majority of the 138 sign languages listed in Ethnologue are linguistically isolated and do not share historical connections.⁷ Nevertheless, there are significant grammatical and lexical similarities

⁵ https://www.upf.edu/en/web/sign-hub/noticies/-/asset_publisher/SJwF0BoBsmIx/content/la-versio-final-del-signgram-blueprint-ja-esta-publicada-/maximized (visited, September 9, 2024).

⁶ <https://thesignhub.eu/> (visited, September 9, 2024).

⁷ <https://www.ethnologue.com/> (visited, September 9, 2024).

between unrelated sign languages. This can be explained, in part, by shared iconic processes, which lead to similar forms across both grammar and lexicon. For example, Vermeerbergen (2006) demonstrated how the grammar of Flemish Sign Language (VGT) shares features with other unrelated sign languages. In addition, iconic processes in sign languages—such as those explored by Taub (2001) and more recently, Perniss et al. (2010)—show that similar iconic forms can lead to parallels in both the grammatical structures and the lexicons of unrelated sign languages. This suggests that while sign languages may be linguistically isolated, iconicity and visual-gestural modality result in similarities that facilitate mutual understanding.

Even without familial sign language ties, signers from around the world report being able to initiate conversations that go beyond simple gestures, a level of communication that hearing individuals do not easily achieve. This can be explained by the different mechanisms at play in signed communication, including historical relationships, iconicity, and language contact. Prior studies on IS have focused on international venues such as sporting events, conferences, and the international community at Gallaudet University, where language contact between signers of various backgrounds has facilitated the gradual evolution of IS lexicon and grammar conventions (Allsop et al., 1995; Mesch, 2010; Rosenstock & Napier, 2015; Woll, 1990). Some scholars have likened these advanced forms of international communication to pidgin languages (McKee & Napier, 2002; Supalla & Webb, 1995), but this comparison does not fully explain how two deaf individuals can engage in a conversation without sharing a common language (Byun et al., 2018).⁸

In addition to language contact, iconicity plays a key role in facilitating international signed communication, as many signs rely on visual representations that can be easily understood across sign languages, even when there are no historical connections between them. IS has also been adopted by interpreters at international conferences, though there is ongoing debate about its limitations, particularly regarding comprehension (Whynot, 2016). Whynot (2016) demonstrated that comprehension of IS is generally lower than that of national sign languages among signers from different linguistic backgrounds. However, it is still more effective compared to, for example, Mexican Sign Language (LSM) comprehension by ASL signers, which

⁸ The question of whether interlocutors using IS are engaging in a shared language is closely linked to the boundaries between languages, particularly in the case of signed languages with shared historical roots (e.g., ASL; see Cagle, 2010).

has been estimated at only 14% (Faurot et al., 1999). This highlights both the significant limitations of and the promising potential for IS as a means of communication.

IS was first formally introduced in interpreting settings at the WFD conference in 1979, and ever since, it has evolved significantly from its early use. Initially, IS was often perceived as being limited to casual or small-scale interactions, where it was considered suitable for conveying basic, everyday experiences (de Wit, 2016). However, as IS developed, its use has expanded to cover a wide range of complex topics in professional and academic settings, especially at international conferences. Moreover, it is important to note that much of current-day IS interpreting is informal and performed by interpreters who are not necessarily accredited by WFD or WASLI (Wit et al., 2021a).⁹ In this dissertation, I systematically examine how IS interpreters work compared to interpreters of a full-fledged sign language like NGT which was legally recognized by the Dutch government in 2021. This comparative approach allows features that may be unique to IS and those common across signed languages to be measured, a gap that has yet to be thoroughly investigated.

Building on previous research, I aim to provide a better understanding of how IS is used by conference interpreters. A WFD report from 2010 highlighted the need for more research on IS and its role in international communication (Mesch, 2010). Discussions about language policies in international meetings within the global deaf community illustrate the challenges of relying solely on specific sign languages like ASL which may exclude those unfamiliar with them (Kusters, 2021; Hiddinga & Crasborn, 2007). However, not all scholars agree on the centrality of IS in these settings. The 'Amsterdam Manifesto' from the TISLR 2000 conference (Rathmann, Mathur, et al., 2000) argued for the key role of national sign languages in international communication, highlighting concerns that IS might marginalize national sign languages. Similarly, Nilsson (2010) has criticized the neglect of interpreters for non-conference languages, raising questions about inclusivity.

Yet, IS has not been considered as a language although in its wording and the linguistic ambiguity surrounding IS this is evident in the varying terminology

⁹ The WFD-WASLI accreditation system for International Sign interpreters is a formal process aimed at assessing and recognizing interpreters' competence in working across diverse international settings. It was established to promote quality and consistency in IS interpreting at high-profile events (<https://wasli.org/sign-language-interpreters/wfd-wasli-is-accreditation-application/>, visited in June 2025).

used to describe it, including international sign pidgin, International Sign (with capital letters as if IS was considered as full-fledged language). Only recently, have Rathmann and Müller de Quadros (2023) and Pinheiro and Stumpf (2022) proposed IS as a language. The ongoing debate over whether IS should be classified as a fully developed language remains unresolved. In this dissertation, I use the most common term, 'IS', to maintain focus on the core of the findings without contributing to the terminological debate. This issue is then revisited in the final conclusion chapter, where my findings are analyzed in relation to this context.

One of the main reasons for the debate on whether or not IS is a language is due to its lack of stable lexicon. Early studies often describe IS as having a 'limited' and 'impoverished' lexicon, however these claims were largely based on anecdotal evidence and theoretical assumptions rather than on systematic empirical research (Allsop et al., 1995a; R. McKee & Napier, 2002). In this dissertation, my empirical research goes beyond these assumptions and I provide new insights into the nature and role of the IS lexicon in multilingual international settings.

Signed language linguistics elements: hands, face, and iconicity

Understanding how IS functions necessitates an exploration of the fundamental components of signed languages. Signed languages are conveyed through movements and configurations involving the hands, arms, upper body, and facial expressions. This section does not aim to offer an exhaustive overview of signed language linguistics but rather highlights key elements—hands, face, and iconicity—to provide the reader with a foundation for understanding the subsequent chapters of this dissertation.

Signed communication, including IS, relies on both manual and non-manual elements working together to convey meaning. The hands play a central role in both the lexicon and grammar of signed languages, representing objects, actions, and ideas through specific phonological forms such as handshapes, movements, and spatial configurations. In addition, grammatical information, such as verb agreement, is often expressed through changes in movement or spatial direction (Sandler & Lillo-Martin, 2006).

Non-manual elements, such as facial expressions, head movements, and eye gaze, are equally critical phonological components. These features add prosody and grammatical information, including marking negation, questions, and emphasis. For example, raised eyebrows typically indicate a yes/no question, while head shakes convey negation (Zeshan, 2004a).

Beyond lexical content, the hands also convey more expressive functions through enactments and constructed actions. Enactments are linguistic structures in which the signer's hands and body depict the actions, emotions, or behavior of individuals or objects in the real world (see Cuxac (2000) for LSF and Hodge & Johnston (2014) for Auslan). Constructed actions, as described by Ferrara and Johnston (2014), involve periods of enactment that often use the entire body. For instance, signers may map a discourse referent onto their body, enacting the person's or entity's actions, thoughts, or utterances. By utilizing space and mapping different referents onto their bodies, signers can visually shift between roles, such as by altering their upper body orientation or gaze (Cormier et al., 2013; Metzger, 1995). Together, these enactments and constructed actions contribute to the non-lexical richness of signed languages which is driven by iconicity.

Iconicity – the motivated relationship between a sign and its referent – is a key feature of signed languages in general (see Cuxac, 2000 for LSF; Pizzuto, 2007, for LIS; Taub, 2001, for LSF). Iconicity in signs visually reflects the referent represented: highlighting one aspect, adjusting the scale or perspective, adding detail, etc. (Perniss, 2020; Sallandre & Cuxac, 2002; Taub, 2001). Therefore, iconicity is more of a gradient nature.

Unlike arbitrary signs, which rely on convention between the form and the referent, iconic signs maintain a non-arbitrary connection between the form and the referent. For instance, a sign that imitates the action of drinking from a cup is more likely to be understood across diverse linguistic backgrounds, provided the observer is familiar with the experience of drinking from a cup (see McGarry et al., 2023; Parkhurst & Parkhurst, 2003; Taub, 2001). Indeed, it is essential to acknowledge that iconicity is not an inherent property of signs but rather depends on the producer/observer's perception and experience (Omardeen, 2018). Occhino et al. (2017) mentions that there is no "objective iconicity" (Occhino et al., 2017, p. 105); then an iconic sign depends on the world experience of the observer. What we define as iconic must take into account culture and conceptualization (Taub, 2001). The degree to which a

sign is perceived as iconic varies, depending on the gradient nature of iconicity and the observer's knowledge and familiarity with the referent. Having said that, iconicity in signed languages have many positive effects for language acquisition and efficient communication and may be seen as an advantage (see Ortega, 2017; Ortega et al., 2014; Slonimska et al., 2020).

In IS, iconicity has always been central. Rosenstock (2008) describes how iconicity operates at both lexical and non-lexical levels in IS. For instance, at the lexical level, iconic signs are more likely to be broadly recognized if they mimic real-world actions or objects familiar to a broad audience. IS users seem to heavily rely upon iconicity to compensate for the lack of a stable lexicon (which is one of the main issue in IS communication); either iconic signs or iconic non lexical-structures. Its emphasis on visually motivated signs allows signers from diverse linguistic backgrounds to grasp meanings, even in the absence of shared conventionalized signs. This lack of core lexicon may lead IS users to focus on iconicity; this distinguishes IS from national signed languages which have a defined core lexicon which is, by essence, less accessible to outsiders (Moody, 2002).

IS conference interpreting

The study of interpreting dates back to the middle of the 20th century with the work of House (1960), but interpreting studies that involve sign languages only gained traction later on, with IS interpreting emerging as an even more recent area of inquiry (Rosenstock & Napier, 2015). I build on previous research by providing new insights into the use of IS by interpreters working from speech to sign, particularly in comparison to interpreters working with a well-studied national sign language, in this case NGT. By directly comparing IS interpreting to NGT interpreting, I aim to quantify widely discussed claims about IS that have not been systematically tested.

Conference interpreting, particularly in international settings, is a complex and cognitively demanding process (Gile, 2009). The use of IS interpreting in such environments introduces additional layers of complexity due to the unique nature of IS, which has been described as a contact sign language that draws upon multiple signed languages (Supalla & Webb, 1995). In this section, I review the current literature on conference interpreting, including its cognitive aspects, different modes of interpreting (simultaneous and

consecutive), terminology, and the roles of hearing and deaf sign language interpreters. I also examine the specific characteristics of IS interpreting, before transitioning into the full presentation of the outline of my dissertation with its research questions.

Conference interpreting requires the interpreter to rapidly process and produce language in real-time, placing significant cognitive demands on working memory and processing speed (Gile, 2009). There are two options: simultaneous or consecutive (see Russell, 2005 for a comparison). Simultaneous interpreting, where interpreters work from spoken or signed content into another language as the source message is being delivered, presents a high cognitive load as it requires the interpreter to manage input, processing, and output almost concurrently. In contrast, consecutive interpreting involves the interpreter listening to or watching the message in full or in parts before producing the interpretation. This allows for more thorough content processing, though it often comes at the cost of real-time immediacy. For both simultaneous and consecutive interpreting, the cognitive task is demanding, particularly in multilingual settings where interpreters must navigate linguistic and cultural differences between the source and target languages. In settings that require real-time translation such as conferences, live events, or educational contexts, most sign language interpreters work using simultaneous interpreting (e.g. Napier, 2016; Stone & Russell, 2014).

In the context of sign language interpreting, both hearing and deaf interpreters play crucial roles. Hearing interpreters typically work from spoken languages to signed languages and vice versa, while deaf interpreters may work between different sign languages or from a text prompt to a sign language (Adam et al., 2014; Cantin & Encrevé, 2022). Deaf-hearing interpreter teams are common in multilingual signed language contexts, where deaf interpreters commonly ensure clarity and accuracy in the delivery of highly nuanced cultural and linguistic information (Russell & Stone, 2014).

The efsli conferences provide a rich setting for observing IS interpreting in action. At each conference, presentations are interpreted simultaneously into both spoken and signed languages, offering a unique opportunity to observe the interplay between national sign languages and IS. For example, at the 2019 efsli conference in Croatia, the official languages were spoken Croatian, spoken English, Croatian SL, and IS. This means that one could come on stage and express in one of these languages/communication system. For

the interpreting part from English, a team of deaf and hearing interpreters collaborated to provide interpretation from spoken English to IS. Instead of going straight from spoken English to IS, the interpreting way was as follows: a hearing interpreter working from English to NGT, and a deaf interpreter then translating from NGT to IS. This interpreting configuration (having one extra step to the final interpreting output), termed “feeding” (Jobse, 2015), adds an extra layer of complexity.¹⁰

In this 2019 efsli setup, multiple linguistic and cognitive processes occurred simultaneously, including not only the interpretation from spoken to signed language but also this intermediary step of interpreting from a national sign language (NGT) to IS (which the final output). This team-based approach highlights the complexity of IS interpreting because it requires the interpreters to navigate differences between two signed languages (NGT and IS) in addition to maintaining the integrity of the original spoken language content (English). Each interpreter must manage not only the transfer between languages but also the adjustments needed for deaf and hearing audiences with different linguistic backgrounds. While team interpreting from English directly to IS also involves cognitive and linguistic multitasking, the added layer of ‘feeding’ between sign languages highlights the unique translanguaging processes at play - namely, the flexible use of diverse semiotic and linguistic resources across modalities and languages (see Kusters et al., 2017) - which are central to IS interpreting (Stone & Russell, 2016a).

In contrast, the 2023 efsli conference in Greece adopted a different configuration. The conference languages were spoken Greek, spoken English, Greek SL, and IS, but this time, hearing interpreters worked directly from spoken English to IS, bypassing the additional step of a national sign language interpretation. This variation in interpreter teams highlights the adaptability required in IS interpreting, where the approach must be adjusted to fit the linguistic demands of the conference and the available resources. Whether interpreters work through a national sign language or directly from a spoken language to IS, they must navigate different linguistic pathways and ensure clear communication across diverse language users. These varying conference setups provide valuable insights into the evolving nature of IS interpreting and illustrate the range of strategies that can be employed in international settings (Wit, 2010). In this dissertation, my primary focus is on data collected from

¹⁰. The term ‘pivot’, more commonly used in spoken language interpreting, can also apply here (Stone et al., 2022),

hearing interpreters who constitute the majority of the IS interpreters (see Wit et al., 2021). Therefore, the term "interpreters" generally refers to hearing interpreters, unless otherwise specified. In cases where the interpreter is deaf (**chapter 5**), I explicitly use the term "deaf interpreter" as commonly used in the literature (Adam et al., 2014).

The intersection of language contact and interpreting creates a particularly rich area of study for IS interpreting. On the one hand, the interpreter engages in the cognitively demanding task of transferring meaning from one language to another—a process that requires not only linguistic proficiency but also the ability to navigate cultural differences and context-specific nuances (Napier, 2006). On the other, IS itself is a contact form of signing that emerges through the interaction of multiple signed languages, often requiring interpreters to blend lexical and grammatical elements from different sign languages to achieve mutual understanding (Rosenstock & Napier, 2016). These dual challenges make IS interpreting a fascinating area for further exploration.

While extensive research has been conducted on national sign language interpreting (Napier, 2015; Pöchhacker, 2004), IS interpreting remains relatively understudied. A number of studies have examined the characteristics and challenges of IS interpreting (Best et al., 2016; Green, 2015; R. McKee & Napier, 2002; Rosenstock, 2008; Sheneman, 2018), yet their findings stem from either anecdotal observations, earlier research, or no direct comparison with other national sign language. This point is crucial to contextualize the findings. Due to a lack of systematic and direct comparison with another national sign language, it remains unknown whether the phenomena observed are typical to IS or similar to another sign language. This is the case for the elongated processing time observed in IS (Best et al., 2016; R. McKee & Napier, 2002) or the lack of consistency of IS lexicon (see McKee & Napier, 2002). To address this gap, the central thread of my dissertation is based on direct comparison. The first three of the four studies presented are based on a strict comparison of selected features of IS interpreting versus NGT interpreting, based on a spoken English source lecture. Differing past claims and findings are tested empirically through a direct comparison of IS and NGT, resulting in a clearer understanding of how IS interpreters operate in multilingual environments and what the linguistic forms they produce look like. In the fourth study, I focus on one specific topic, the use of lexical signs when interpreting from NGT to IS.

Outline of the dissertation and research questions

I address the research questions formulated below in four separate studies corresponding to the next four chapters, with studies 1 and 4 having been published. In my research methodology, I did not follow the traditional path of solely focusing on one type of sign language interpreting and qualitative observation, as is common in the field of sign language interpreting (Hale & Napier, 2013). I compared two types of sign language interpreting with a strong focus on quantitative results. Although practical restrictions make the number of interpreter subjects in each study fairly small, this thesis is the first to present extensive quantitative results on a comparison between interpreting to IS and a national sign language (in this case NGT) in settings that were as natural as possible. The novelty of my dissertation is that to highlight the features of IS interpreting, I contrasted them in a direct way with interpreting to a full-fledged national sign language, in this case NGT.

I begin **with Chapter 2**, which focuses on a primarily quantitative study comparing processing times (lag time) in IS versus NGT interpreting. It answers the first research question (**RQ 1**): “How long is the processing time in IS vs. NGT interpreting?” Previous literature reports on instances of extended processing time– i.e. “the time between the delivery of an original message and the delivery of the interpreted version of that message” (Cokely, 1986, p. 341) – by IS interpreters (Best et al., 2016; R. McKee & Napier, 2002). However, this “extended” processing time has not been studied systematically but seems to stem from anecdotal observations. Moreover, it is labelled “extended” in comparison with other studies on signed and spoken language interpreting; between 2 and 6 seconds (see Cokely 1986; Defrancq 2015) thus using unrelated datasets and not in a direct comparison with the same interpreting situation. In my study, I offer a direct comparison of processing times between IS and NGT interpreters using more recent (2018) collected data. Initially, I hypothesize that processing times in IS interpreting would be notably longer than in NGT interpreting. However, the results reveal a subtler outcome than anticipated. **Chapter 2** closes with qualitative observations to show what is hidden behind these quantitative processing time results., providing concrete tools for IS interpreters.

In **Chapter 3**, I start from a population gap in the breakdown of the sign types of IS interpreting. This chapter answers research question (**RQ 2**): What is the sign type distribution of IS interpreting and does it differ from NGT interpreting?

While Whynot (2016) conducted a sign type analysis for deaf presenters using IS (expository IS), this analysis has not yet been performed for interpreters. Furthermore, Whynot (2016) compared the sign type distribution in expository IS to unrelated datasets; national sign language corpora in different contexts. I address these two gaps by providing sign type distributions for IS interpreters and conducting a methodological comparison within the same interpreting context, i.e. IS versus NGT interpreting. The analysis, based on a 2019 dataset, examines various lexical and non-lexical sign types used in IS and NGT, including lexical signs, depicting signs, pointing signs, fingerspellings, enactments, palm-up signs, and numbers.

Drawing on previous literature (e.g. Moody, 2002; Rosenstock, 2008) that emphasize how IS maximizes iconic structures and non-lexical resources, I hypothesized that IS interpreting would utilize a greater amount of non-lexical resources absolutely and relatively in comparison to NGT interpreting. Interestingly, the results deviate from these expectations and present a more nuanced picture.

Next, in **Chapter 4** I address the extent to which lexical signs are used. I answer **RQ 3**: What are the *lexical diversity* and *lexical frequency* in IS versus NGT interpreting? As Moody aptly noted in relation to IS interpreting: "The real problem is the lexicon." (Moody, 2002, p. 34). Building on the findings of **Chapter 3**, I narrowed the focus to the principal sign type: lexical signs. In the literature, the lexicon has been characterized as 'limited' and 'impoverished' (see Allsop et al., 1995 and Rosenstock, 2007). To operationalize these descriptions, I conducted an analysis of lexical diversity and frequency in IS in comparison to NGT, using a sub-dataset from Chapter 3. The results show that while IS interpreters use a somewhat narrower range of lexical signs compared to NGT interpreters, the differences in diversity and frequency are subtler than previously suggested. **Chapter 4** thus contributes to a deeper comprehension of the usage of lexical signs in IS and explores whether the terms 'limited' and 'impoverished' still hold validity.

For the final study presented in **Chapter 5**, I delve into the phenomenon of interference, which is described as an influence in our study (Pöchhacker, 1994a). This chapter addresses the research question (**RQ 4**): "How do IS interpreters borrow source NGT lexical signs and apply them in their target IS interpreting?" This research, based on a 2018 dataset, focuses entirely on qualitative methods, examining how deaf IS interpreters apply borrowed NGT

source lexical signs to the target IS output. I describe the different strategies used by deaf interpreters to borrow lexical signs from the source discourse. The description of these strategies directly feeds IS interpreter practice and the work of IS interpreter trainers.

This last study is unique thanks to its examination of IS interpreting by a team of two deaf interpreters, offering both linguistic and political insights. On a linguistic level, I focused on lexical borrowings and how NGT signs were applied to the IS target. On a political level, representation matters. Shedding light on deaf interpreters use of IS in a conference shows how deaf interpreters can be part of IS interpreting. In addition, it directly brings a deaf-centred perspective to IS and the deaf interpreters' choices provide insights into what is considered as 'visual enough' and if not, which additional resources are needed.

Finally, in **Chapter 6**, the findings from each preceding chapter are presented and discussed in concert. These are used as a basis for drawing general conclusions about the status of IS as a fully developed language and the defining characteristics of IS interpreting, derived from a direct comparison with NGT interpreting. Additionally, **Chapter 6** includes recommendations for further research based on the datasets used in this study, which are available to researchers under specific licensing agreements (Appendix 1 for list and access). Importantly, the chapter also suggests potential paths for future investigations stemming from my findings.

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Chapter 2

Comparing IS and NGT interpreting processing time: a case study

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Abstract

This study investigated the duration of the processing time between two teams of international sign (IS) and Sign Language of the Netherlands (NGT) interpreters working in parallel from the same source discourse in a conference setting. IS interpreting is increasing in international settings and IS interpreters tend to work along with national SL interpreters. Two studies on English to IS interpreting reported an extended processing time for IS interpreters based on data from 1995 (McKee and Napier, 2002) and 2002 (Rosenstock, 2008), ranging from between 10 and 16 seconds (McKee & Napier, 2002). In contrast, in another study on ASL interpreting, the interpreters' processing time was between 2 and 4 seconds (Cokely, 1986), which corroborated the values measured for spoken language interpreting of between 2 and 5 seconds (Timarová, 2011). In our study, based on data collected in 2018, we compared the processing time of a group of IS interpreters to the processing time of a group of NGT interpreters. The results showed no statistically significant difference in the interpreting processing time between the IS and NGT interpreters. The results do not align with the reports from previous IS interpreting studies but are similar to the processing times seen in spoken language interpreting (Timarová, 2011) and in one study of ASL interpreters (Cokely, 1986). The difference between IS and NGT interpreting processing time in this study appears to depend more on individual differences between interpreters than on the languages involved.

Introduction

International sign (IS) interpreting is one of the recent signed language (SL) interpreting practices inherited from the past and shaping (changing?) the future of sign language interpretation worldwide to a great extent. Indeed, an increasing number of European institutions and deafness/ SL-related conferences choose to use IS as one of their official languages. Nowadays, it is common to see a national SL interpreter working on stage along with an IS interpreter.¹¹ Observing this situation, many (included us) tend to have the intuition that the processing time of the IS interpreter is much longer in comparison to the national SL interpreter working alone. Do IS interpreters indeed have a longer processing time than national SL interpreters? This research aims to provide an answer to this question.

Processing time in interpreting, also known as lag time, ear-voice span or in French *décalage*, is defined as “the time between delivery of an original message and the delivery of the interpreted version of that message” (Cokely, 1986, p. 341). For spoken language interpreting, previous studies have measured means of processing time between 2 and 5 seconds (Timarová, 2011, p. 122).

In simultaneous interpreting, the time between “the moment a segment is heard and the time it is reformulated in the target language” (Gile, 1997 cited in Pöchhacker & Shlesinger, 2002, p.172) reflects the cognitive processing of simultaneous interpreting. Indeed, simultaneous interpreting is not merely repeating something in another language (which would be shadowing), but it involves extracting the meaning of a linguistic utterance or series of utterances and re-expressing it in another language. Comparison studies between shadowing and simultaneous interpreting have shown that simultaneous interpreting leads to increased cognitive load. For instance, this was indicated by having a bigger pupil dilation (Hyönä et al., 1995) and by an extended processing time (Treisman, 1965).

Processing time in SL interpreting

Based on the literature in English, only a single study related to the processing time in SL interpreting has been conducted so far.¹² Cokely (1986) recorded

^{11.} See conferences from Wasli, Efsli, WFD, TISLR, etc.

^{12.} A relevant study in French, based on one LSF interpreter’s Master thesis, also addresses processing time in sign language interpreting (Chasez, 2014).

four ASL interpreters working from English to ASL during a national conference in the US, in 1983. These ASL interpreters had 7 to 8 years of working experience. Cokely measured the processing time of these four interpreters and correlated the results with the miscues occurring in the target language (ASL). According to Cokely, a miscue is “[...] a lack of concordance between the information in a T[arget]L[anguage] interpreted message and the information in the S[ource] L[anguage] message it is supposed to convey” (Cokely, 1986, p. 344).

Quantitatively, the processing times measured were an average of 2 seconds for two interpreters (ranging between 1 and 4 seconds for one interpreter and 1 and 5 seconds for the other one), and an average of 4 seconds for the two others (ranging between 1 and 6 seconds for both interpreters).

However, Cokely does not provide a description of the method regarding the way the measurements had been done. Figure 2 (based on Cokely’s original graph) illustrates how the processing time in words is a function of the duration of the source language utterance.

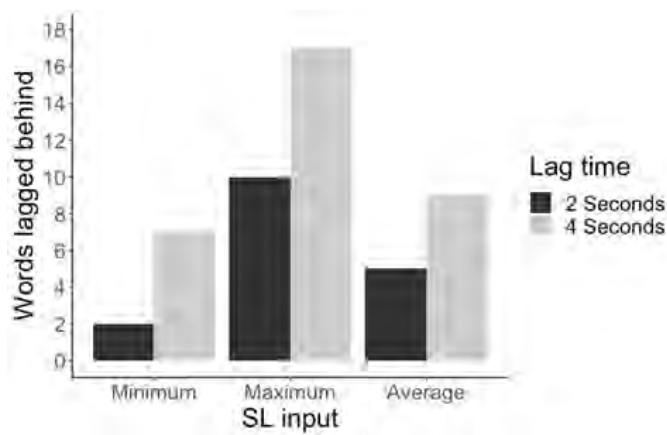


Figure 2. Source language (SL) input as a function of lag time (based on Cokely, 1986, p.344)

Qualitatively, the main finding is the fact that when the processing time is longer, the number of miscues is lower. Cokely argues for using a longer processing time in simultaneous interpreting situations in order to produce a more accurate interpretation: “The greater the lag time, the more information available; the more information available, the greater the level of comprehension.” (Cokely, 1986, p. 375).

Cokely's study is unique in the sense that it investigates interpreting in a cross-modal setting – that is, the source and target languages are produced and perceived in different modalities¹³ (spoken: vocal-auditory; signed: gestural-visual).¹⁴ Because of this modality difference between source and target languages, we might expect an average processing time for SL interpreting even longer than the average processing time measured in spoken language interpreting. This is because modality differences may result in very different strategies being used to structure the target text. Cokely mentions that “when the structures of the two languages are similar, a shorter lag time may be possible; however, when the structures are significantly different, longer lag time is required” (Cokely, 1986, p. 343). So far, no systematic quantitative research has supported this assumption, and even Cokely's study on ASL interpreting align with the results related to spoken language interpreting. He found an average processing time between 2 and 5 seconds, which reflects processing times identified in the previous literature in interpreting between spoken languages.

However, this assumption might be shown to be correct when we investigate the processing time in IS interpreting. Interpreting into IS adds further complexities, as this is not a fixed linguistic system with a consistent lexicon and grammar. Rather, IS is a way of communicating used by SL interpreters during international events. It is similar to how cross-signing communication is used between deaf individuals without a shared language (Hiddinga & Crasborn, 2011; Zeshan, 2015). Despite its debated linguistic status (Hansen, 2016), IS is an effective way to convey a meaning to a multilingual broad deaf audience. However, IS, as used by interpreters in European institutions and studied by researchers, is mainly targeted to a Western deaf audience with a certain level of education (Rosenstock & Napier, 2015). At the same time, IS is dependent on the context and target audience and may thus differ from situation to situation. Also, IS has a minimal repertoire of signs (Allsop et al., 1995a; Moody, 2002). Whynot (2016) found that some 200 signs recurred frequently in her dataset across presenters using IS at WFD meetings. In comparison, the national SLs that have been documented are known to have a conventionalized lexicon consisting of signs numbering in – at least – the

^{13.} Here, we are looking at simultaneous interpreting and not consecutive interpreting. For simultaneous interpreting, we do not quite know what the modality effects are. Would it take more or less time to go from auditory to visual or vice versa, in comparison to working from speech to speech with a headphone on in a sound-isolated booth?

^{14.} SLs used by DeafBlind individuals are a tactile rather than visual perception. Tactile signing is, however, outside the scope of this study.

thousands (for instance, more than 6000 lexicalized signs according to LSF dictionaries).¹⁵ Reducing the use of lexical items, one of the strategies used in producing IS is to make maximum use of different types of iconic strategies available to signed languages (Cuxac, 2000a; Taub, 2001). In summary, IS has been recognized as a form of SL with fewer conventionalized signs (Dickinson, 2012; Rosenstock, 2008).

Lexicalized signs in SLs are comparable to the words in spoken languages. For instance, a sign is often glossed with a corresponding word. Therefore, we could assume that if spoken languages and national SLs are very dissimilar from each other, spoken languages and IS are even further away as there are fewer signs. In that case, lexical meaning in the spoken language has to be converted to an equivalent expression that uses fewer lexical signs in IS or gestures and a series of gestures and signs as mentioned by Adam (2012). This situation might lead to a longer processing time for IS interpreting. So far, no systematic quantitative data have corroborated this assumption, but two studies on English to IS interpreting briefly report and support it.¹⁶

First, McKee and Napier (2002) analyzed 14 minutes of authentic data for four IS interpreters working from English to IS, in 1995, in three different international conferences in Finland, Denmark and Austria. We do not know more about the audience involved but it is likely that they were from European-western countries. They report an "extended lag time" which was "commonly between 10 to 16 seconds, and sometimes more" (R. McKee & Napier, 2002, p. 42) but no average value nor descriptive method of the measurement is reported. Their study is mainly qualitative. They describe different strategies used in the IS output.

Second, Rosenstock (2008) explores a 10-minute stretch of two IS interpreters working in an international conference in the US, in 2002. Again, we do not know more about the audience involved but we assume it might have been mainly American and from European western-countries. She writes about a strategy "to reduce lag time" (Rosenstock, 2008, p. 146), implying long processing time value(s) might be something IS interpreters need to manage.

^{15.} Yet, these dictionaries are bilingual limited glossaries and not unilingual exhaustive LSF dictionaries (Galant & Collectif, 2013; Girod et al., 1997; Girod & Collectif, 1997).

^{16.} Here, we are not looking at IS to English simultaneous interpreting. Actually, one study from IS to English interpreting reports an isolated value of processing time: 18 seconds. This long processing time is related to the strategy of expansion used by the IS interpreters (see Best, Napier, Carmichael, & Pouliot, 2016).

However, here again, there is no systematic quantitative data, nor a description of the method of the measurement. The study is qualitative and focuses on the role of iconicity in IS interpreting.

In order to complement these previous studies, our study aims to report quantitative data on IS and NGT interpreting processing time, using a more recent and larger amount of data. How long is the processing time in IS vs. NGT interpreting? To answer this question, we collected authentic data during a small-scale international event and selected a way of measurement among different methodologies used previously in the field of spoken language simultaneous interpreting.

Methodologies of research in processing time

Previously, many studies related to spoken language interpreting have measured processing time values following different methodologies. However, no matter what the methodology used is, “[...] there seems to be an agreement that the average of time lag in simultaneous interpreting is roughly between 2-5 seconds, extending up to around 10 seconds [...]” (Timarová, 2011, p. 122). Irrespective of the methodology chosen to measure processing time, you need to decide on a unit and point of measurement.

The *unit* of measurement is the processing time quantified in some explicit way: e.g. the interpreter lags n words, n syntactical units, or n seconds behind the speaker. For instance, Gerver (1969) found an ear-voice span mean of 5 words behind the speaker when the rate of the input was 120 words per minute.

The *point* of measurement is the way the source discourse is chunked to measure the processing time: every five seconds, every 5th words (Gerver, 1969), at the beginning of every sentence, at the beginning of every unit of meaning, etc. Then, starting from these points of measurement, the word/sign/meaning matching correspondence has to be found in the target discourse. Timoravá et al. (2011) provides an overview of previous time lag studies. The most common unit of measurement to express the processing time is the unit of second. Concerning the point of measurement, every 5 seconds and the start of the sentence are the most common ways. For our study, we choose to follow Podhasjská (2008) and chunk the source discourse into units of meaning following Lederer’s rationale (1978).

Indeed, interpreting is about extracting the meaning of an utterance and re-expressing it in another language. Interpreters do not follow the words/signs but the meaning of the utterance. This led Lederer to put forth the general concept of unit of meaning: "I suggest that such units are segments of sense appearing at irregular intervals in the mind of those who listen to speech with a deliberate desire to understand it. [...]" (Lederer, 1978, p. 330). She even goes further regarding to the interpreting task: "Chunks of sense appear in interpretation whenever the interpreter has a clear understanding of the speaker's intended meaning" (Lederer, 1978, p. 300).

In summary, units of meaning are a sequence of words long enough to make sense and give access to the intention of the speaker. Interpreters do not translate words but meaning, and even perceived intention. They interpret pragmatic meaning which is the linguistic goal an utterance or series of utterances aim to achieve. This concept of unit of meaning has fully led to "the Meaning Theory" developed by Lederer & Seleskovitch (2014) in Paris 3 University/ESIT. Hundreds of conference interpreters have been trained using this theory.¹⁷ Therefore, we decided to annotate our data by first chunking the source discourse into units of meaning.

Method

The length of the processing time varies according to several factors, internal to the interpreter (individuality, expertise, experience, etc.) and external to the interpreter (content discourse difficulty, the accent of the speaker/signer, delivery rate, languages involved for interpreters and audience attendees, etc.). These internal variables are hardly controllable so it is impossible to fully compare the exact same situation, factor, characteristic, etc. in interpreting studies. However, we controlled the external ones by asking the interpreters to work in parallel for the same assignment as it is often the case in many other conferences, as mentioned beforehand.

Data collection

We collected a dataset of three English-spoken lectures on SL linguistics by different non-native English speakers. This event took place at Radboud University, in Nijmegen (The Netherlands), in May 2018, as part of a regular

¹⁷. See the website of ESIT Alumni association (<https://www.aaeesit.com/page/presentation>, visited in October 2019).

lecture series on sign linguistics ('Sign Pop-ups'). The structure of each lecture was 45 minutes of lecture and 15 minutes of Q&A session. The whole 3-hour event was simultaneously interpreted by two accredited¹⁸ IS interpreters and two registered NGT interpreters, in parallel. As usual, interpreters were relaying each other every 15 minutes more or less. From the audience's perspective, IS interpreters were situated at the left of the screen (where the slides were displayed) and NGT interpreters at the right side. The speaker was standing at the extreme right side of the screen, next to NGT interpreters. Therefore, interpreters were both standing next to the screen and could refer to it if needed. The Figure 3 illustrates this setting. We set up 3 cameras: one on the IS interpreter and the slides, one on the NGT interpreter, the slide and the presenter, and one on the NGT and IS deaf audience.

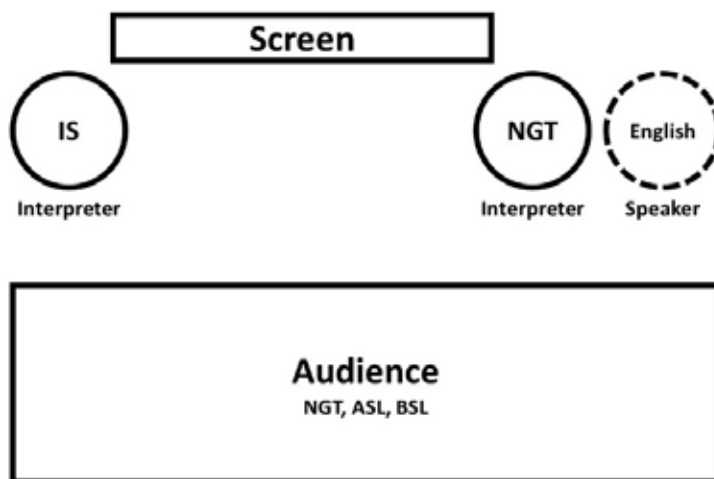


Figure 3. Setting of the event

The lectures were intended to a linguistic academic audience: researchers and students, from Nijmegen, the cities within the Netherlands and even the countries close by. The audience was mainly hearing, with few deaf attendees. Two Dutch deaf people were receiving the presentation via NGT interpreting, and one single American deaf person was receiving the presentation via IS interpreting. This American deaf person has been living out of the US since more than 10 years and has been using BSL for the past few years. More, she is currently using NGT and IS in her daily workplace and had already had many opportunities to work with these IS interpreters.

¹⁸. WFD-WASLI accreditation.

Participants

For this paper, our primary focus is on the interpreters (see Table 1). Their work is influenced by the speakers and the audience involved (most of all for the IS interpreters), as detailed in section 4.1. For interpreters, we attributed an odd-number to IS interpreters and an even-number to NGT interpreters. For the speakers, we assigned a letter to each of them (see Table 2).

Table 1. Demographic information of the professional interpreters

Interpreters	Mother-tongue	Acquired languages	Basics knowledge of languages	Interpreted to	Years of experience
1	NGT and Dutch	English, IS	ASL, LSF	IS	35
2	Dutch	English, NGT, IS? ¹⁹	French, German, BSL	NGT	13,5
3	Dutch and German	English, NGT, ASL ²⁰	French, Italian, Portuguese and Spanish	IS	16
4	Dutch	English, NGT, some IS	German, French, Italian, ASL	NGT	6

Table 2. Demographic information of the speakers

Speakers	Mother-tongue
A	Russian
B	Italian
C	French

After the three lectures, the interpreters were asked to briefly reflect on their performance/the event. For NGT interpreters, their main difficulty was to be working in a relatively unusual setting, i.e. from non-native English to NGT and not from Dutch to NGT. Besides, the two Dutch interpreters involved had already worked from English into IS from time to time. Therefore, it was hard to not switch to IS while interpreting from English to NGT. For IS interpreters, the main point was to not produce a too strong ASL version²¹ of their IS as they knew the background of the international deaf attendee. These two

^{19.} NGT 2 interpreter herself added the question mark regarding her IS acquisition.
^{20.} NGT 4 interpreter did not mention IS as a fully or partially acquired language even though she has been working from English/Dutch to IS few times for one year.
^{21.} On the use of ASL in IS, see the blog article: “How much is it too much? On the use of ASL in IS”, <https://mobiledeaf.org.uk/aslis/> (visited in October 2019).

factors might influence the duration of the processing time values for IS and NGT interpreters.

Data annotation

The video footage of the interpreters was imported into ELAN, software developed by the Max Planck Institute for Psycholinguistics in Nijmegen (Crasborn & Sloetjes, 2008). ELAN enables us to transcribe many features of linguistic and interpretation strategies on multiple annotation layers (tiers).

First, we annotated the source discourse chunking it in units of meaning (points of measurement as mentioned before). The concept of a unit of meaning as point of measurement has the advantage of being directly related to the essence of the work of the interpreter but it remains fairly subjective. Some guidelines can help to the consistency of the annotation between different annotators or allow the replication of this method. In this case, one annotator has done the task and another one has reviewed it; both are sign language interpreters and researchers. Basically, in the source discourse, a unit of meaning could be a sentence, a part of it, a proposition, or even a word. This mainly depends on the tone of the voice and the pauses done by the speaker. The aim is to not segment word by word, but to segment rather at the sentence-level. Prosodic and production factors (such as hesitations) may lead to smaller-than-sentence units.

Form-wise, a unit of meaning starts after a pause and ends with the voice going down or staying in suspension. Content-wise, a unit of meaning must contain sense or at least the intention to render sense (Lederer, 1978).

Then, we annotated the processing time for each interpreter on a dedicated tier, as visualized in Figure 4. The processing time annotation starts when the speaker starts to utter a source unit of meaning and ends when the interpreter starts to produce the target correspondence of this source unit of meaning. It corresponds to the time between the start of the speaker and the start of the interpreter. We did not annotate the target utterance of the interpreter.

The annotation of the start of the interpreter (i.e. end of the processing time annotation) followed three possibilities. First, the interpreter is resting in a neutral position, hands-crossed (or not) and down. When she/he is ready to interpret she/he raises the hands to produce the target utterance. We decided to annotate the moment when the hands of the interpreter are in front of the

chest, which can be considered as the neutral signing space. Even if the first sign is supposed to be positioned in a higher space, the intention, the goal to produce the target utterance is obvious at this moment.

Second, the interpreter is still resting in a neutral position, hands-crossed and up (in the neutral signing space, in front of the chest). When she/he is ready to interpret, she/he releases the hands to produce the target utterance. We decided to annotate at the very beginning of the release of the hands.

Third, the interpreter is interpreting a unit of meaning and does not lower her/his hands before interpreting the next unit of meaning. The hands are still raised in this neutral signing space or higher. Therefore, we decided to annotate the start of the interpreter at the very beginning of the first movement of the following sign related to the interpretation of the corresponding source unit of meaning.

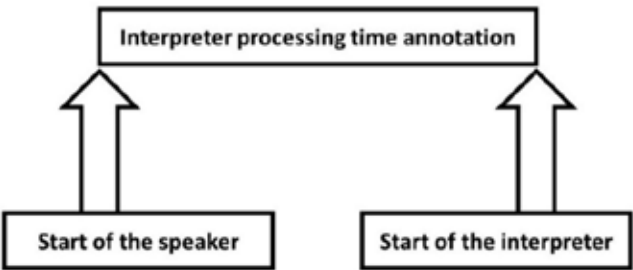


Figure 4. Example of processing time annotation

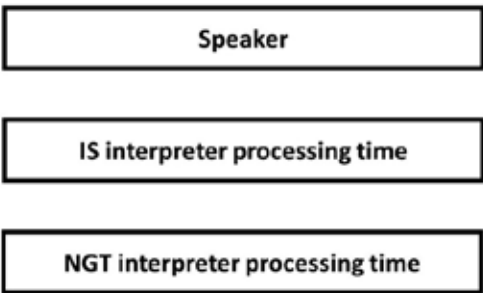


Figure 5. Tiers in ELAN

We started the annotation process with three tiers, listed in Figure 5: Speaker utterance, IS interpreter processing time, and NGT interpreter processing time.

Then, we added two more tiers: IS interpreter processing time overlap and NGT interpreter processing time overlap. This reflects the moment the target utterance related to the previous source utterance has not yet started but the next source utterance is already produced. The processing time is overlapping with the next source utterance, as visualized in Figure 6.

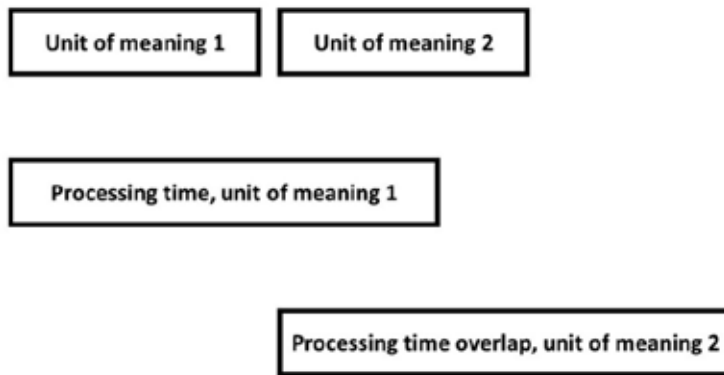


Figure 6. Example of processing time overlapping

Finally, one last tier was added to annotate the false starts of the interpreter. These interpreter's false starts did not correspond to false starts of the speaker. This tier was related to the processing time tier of the interpreter and was meant to mention whether a processing time annotation corresponded to a false start.

We identified three types of false starts. The first one is when the interpreter starts and stops right after, to start again in a different way. The second one is when the interpreter starts and freezes at the first position and movement of the beginning of a sign, then continues signing this same sign. And the third one is when the interpreter starts with one sign, then stops and crosses hands again, and starts again in a different way. These false starts are part of the calculation of the average processing time for interpreters as the intention to produce is obvious, even more, the production has started indeed.

For each lecture, we initially wanted to annotate the first 5 minutes, 2.5 minutes in the middle and the last 2.5 minutes of each IS and NGT interpreters, in the three lectures. These 10-minute excerpts were chosen because we wanted to have a general overview for each interpreter all along the assignment. However, due to technical issue (dead battery at the end of lecture B), we were not able to annotate the end of some interpreting relays. Therefore, we downsized our aim²² to 7.5 minutes, even though we got stuck at 6 minutes for lecture B (see Table 3). During the event, IS interpreter 1 was working in parallel with NGT interpreter 2, and IS interpreter 3 with NGT interpreter 4.

Table 3. Overview of data annotation in minute

	Lecture A	Lecture B	Lecture C	Total
IS interpreter 1	7 mins 30 secs	6 mins	7 mins 30 secs	21 mins
NGT interpreter 2	7 mins 30 secs	6 mins	7 mins 30 secs	21 mins
IS interpreter 3	7 mins 30 secs	10 mins	7 mins 30 secs	25 mins
NGT interpreter 4	7 mins 30 secs	10 mins	7 mins 30 secs	25 mins

In total, regarding working languages, we have an annotated dataset of 46 minutes for IS interpreters and 46 minutes for NGT interpreters.

Data analysis

Once the selected video footage had been annotated, we ended up with 784 points of measurement (392 for IS interpreting and 392 for NGT interpreting). We exported these points of measurement into Excel to calculate the values of the processing time per interpreter, per language, and provide means and ranges of it. Then, we used R to visualise our results.

Results: means and ranges of values

In quantitative terms, the results show that the two IS interpreters have a longer processing time than the two NGT interpreters. However, the difference between IS and NGT interpreting processing time is not that significant. With two participants in each group, it is more likely that the variation observed relates more to the individual interpreters than the language pairs involved, i.e. IS vs. NGT.

^{22.} This 10-minute data annotation aim was achieved once for lecture B and IS3 and NGT4 interpreters.

Processing time per interpreter

The results of the means and the ranges of the processing time are presented in Table 4.

Table 4. Overview of values of processing time in second

	Mean	Range
IS 1	2.7	0.5-8.2
NGT 2	2.6	0.3-9.9
IS 3	2.9	0.7-6.0
NGT 4	1.9	0.3-11

Looking at the Figure 7 it is obvious how watching at the two IS and NGT interpreters in parallel make us observe that IS interpreting processing time is longer. However, the difference is more a matter of individual interpreters than languages involved; and interpreter NGT 4 showed the shortest processing time of the four.

Processing time and length of the source utterance

The visual impression we get from this first case study is a correlation between X&Y, namely the longer the utterance, the longer the processing time (see Figure 8).

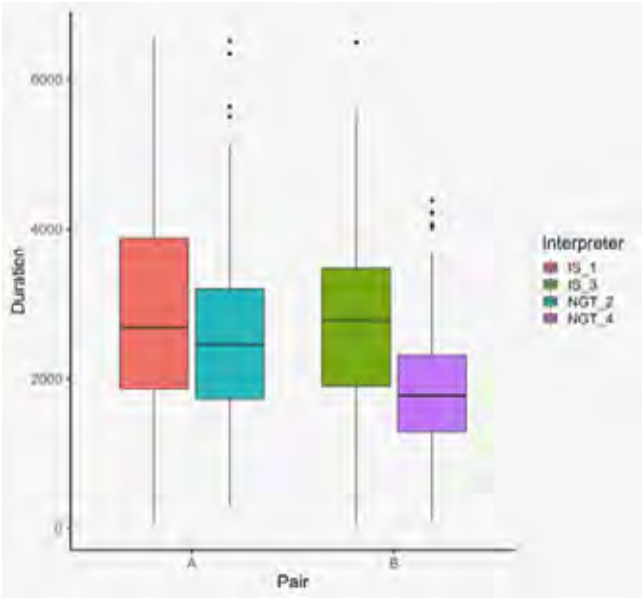


Figure 7. Visualization of processing time values per interpreter (in millisecond)

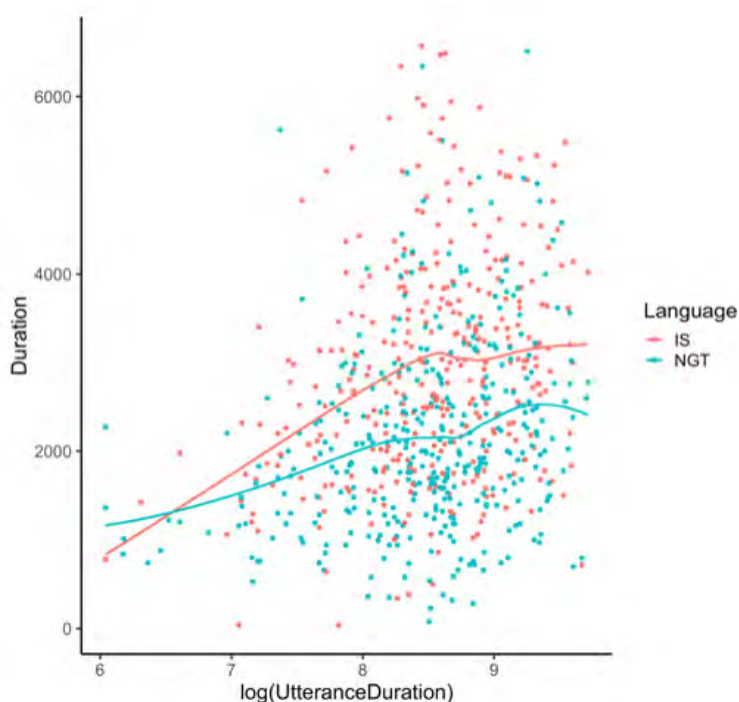


Figure 8. Visualisation of processing time values in relation to the duration of the source utterance

One qualitative observation

This process-oriented study is quantitative in nature and does not aim to report extensively on qualitative results. However, we observed a couple of false starts from NGT and IS interpreters. And, some false starts by NGT interpreters particularly drew our attention. Sometimes, the false start from NGT interpreter had the particularity to start again when the parallel working IS interpreter started for the first time to few micro-second. This observation shows how NGT interpreters may have rushed to interpret from time to time when they could have waited more, at least as much as the IS interpreter. More, this observation supports the " 'IS interpreting monitor' to review the decision and tackle a larger chunk of text in order to maximize contextual information and completeness of the message" reported in McKee and Napier (2002, p. 43). This preliminary observation might lead to insights for future research and how national SL interpreting can gain out from IS interpreting, as suggested also by McKee and Napier (2002).

Discussion and future directions

In conclusion, this case study shows how IS and NGT interpreting can fall under the scope of spoken language interpreting in terms of processing time. The mean values of interpreting processing time have been measured between 1.9 and 2.9, when the common measurements are between 2 and 5 seconds for spoken language interpreting.

However, these IS interpreting processing time values do not align with the very high values reported in the earlier IS interpreting study from McKee & Napier (2002), even though the common intuition (longer IS processing time) seems to be founded, in this dataset too. In this case study, the two IS interpreters have a longer processing time in comparison to two NGT interpreters when interpreting the same discourse. Still, the differences are between individuals and not language pairs.

Given this unusual setting, the task of English to NGT interpreting was also challenging as this is not the common working language combination of these two NGT interpreters. We might assume that the task was more cognitively demanding than the usual one from Dutch to NGT. Also, the two IS interpreters targeted one single deaf attendee while previous studies included a more numerous and wider audience. Here, we might assume that the task was less cognitively demanding than targeting different deaf attendees from different countries. Still, even in this context, the processing time is longer for the two IS interpreters. Other contexts could have led to even higher differences.

This case study cannot be fully compared to the previous IS interpreting studies. The only certain common point between these studies and ours is the setting: conference interpreting. Otherwise, the IS system, the audience and the interpreters are different.

The practice of IS interpreting is always changing and adapting to the audience. Back in 1995 for McKee and Napier's data and 2002 for Rosenstock's, IS interpreting was even less spread, so less conventionalized than now. The work of expanding the concept might have been more extensive and cognitively demanding; leading to an extended processing time. Nowadays, some recurrent signs have been spotted by Whynot (2016) which may lead to less effort to provide the corresponding target utterance in IS.

Mainly, this case study helps us to further refine our methodologies and emphasize the differences between interpreters. This necessitates looking at larger numbers of interpreters but also at larger numbers of data points within more different interpreting situations included a more diverse deaf audience.

Finally, working memory might be at stake as well. A previous study from van Dijk et al. (2012) has shown the link between quality of interpreting and working memory. To follow the path of first, Cokely (1986) and second, McKee and Napier (2002), we hope to qualitatively analyze the potential correlation between the processing time and the quality of interpreting, in the future.

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Chapter 3

Comparing IS and NGT interpreting sign type distribution

"On ne compare pas des pommes avec des oranges"

- French proverb

Abstract

This study examines the distribution of sign types in international sign (IS) and *Nederlandse Gebarentaal* (NGT) interpreting, providing new insights into the nature of IS as a communicative system. IS, often used as a lingua franca among deaf individuals from diverse linguistic backgrounds, relies heavily on iconic and non-lexical resources to overcome the lack of a shared lexicon. While previous research has focused on expository IS, little attention has been given to sign type distributions in IS interpreting.

By analyzing data from two parallel interpreting teams in IS and NGT, this study reveals significant differences in their compositions. Lexical signs constitute 59.9% of IS interpreting compared to 80.2% in NGT interpreting, reflecting IS interpreters' reliance on iconic and flexible elements to ensure accessibility. This aligns with qualitative observations that IS interpreters actively seek alternatives to lexical signs.

By comparing IS and NGT data with other national sign languages, this research underscores the distinct characteristics of IS interpreting and challenges perceptions of its lexicon as limited. These findings advance discussions on the linguistic status of IS and its potential recognition as a language.

Introduction

When it comes to communicating internationally, many hearing people use English as a lingua franca (Bierbaumer, 2020; Seidlhofer, 2011). English has a long-standing history of being used in all kinds of private and public international contexts, from academic conferences and educational settings, to travelling abroad. For deaf people, the story is different. There is no agreement on a single national sign language for use as a lingua franca; not even one from an English-speaking country, such as ASL for the US. Instead, in situations where deaf people do not share a national sign language, they communicate using international sign (IS) (Hiddinga & Crasborn, 2011). Although IS is influenced by ASL and deaf users perceive the increasing dominance of ASL in IS, ASL is still not the (sign language) lingua franca (Kusters, 2020).

"The term IS has been broadly used to refer to a range of semiotic strategies of interlocutors in multilingual signed language situations, whether in pairs, or in small or large group communications. It is described as a signed language contact phenomenon [...], a form of contact signing used international settings where people who are deaf attempt to communicate with others who do not share the same conventional, native signed language". (Whynot, 2016, p. 1). The actual form of IS used in practice can vary depending on the context: who uses IS (e.g., deaf people, interpreters), where it is used (e.g., the Netherlands, China), and why it is used (e.g., first encounter, interpretation). These factors influence the form/composition IS takes and how it is labelled. Figure 9 presents IS as an umbrella term referring to different types of international sign communication²³, placed on a continuum depending on the degree of conventionalization (see Crasborn & Hiddinga, 2015; Zeshan, 2017).

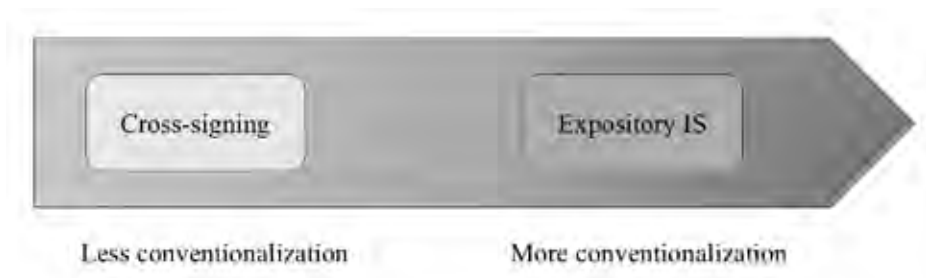


Figure 9. IS continuum depending on its degree of conventionalization

²³. Non-exhaustive list.

IS is thus an umbrella term and its composition, namely the different types of signs it contains, ranges from less to more conventionalized forms. Depending on the type of IS, different labels have been used, i.e. *cross-signing* (deaf people meeting for the first times; see Byun et al., 2018; Zeshan, 2015) *expository IS* or *IS lectures* (deaf presenter; see Monteillard, 2001; Whynot, 2016), and *IS interpreting* (hearing and deaf interpreters, see Wit et al., 2021), involving varying degrees of conventionalizing. *Cross-signing* interactions where interlocutors co-create meaning are known to have a high degree of flexibility, which implies a low degree of conventionalization. This has been observed during repair sequences of misunderstandings, as described by Byun et al. (2018). *Expository IS* is more conventionalized, as the presenter expresses a message in unilateral communication and does not co-create meaning with the audience; though real-time feedback from the audience can be considered.²⁴ Lastly, further conventionalization may be inherent to *IS interpreting*. Like expository IS, the communication is unilateral but, in this case, conveying a unilateral message also involves time constraints due to the pace of the presenter. During simultaneous interpreting, not only must interpreters follow the presenter's pace, they also have the dual task of listening and producing. This situation gives IS interpreters less time to produce signing output in comparison to IS presenters and can lead to interpreters choosing more conventionalized (i.e. lexicalized) forms.²⁵ Yet, only one unpublished Master thesis has explored the composition of IS resulting in more than 50% of conventional elements (Moreno, 2022). This current study will investigate this systematically and deeper.

Despite this distinction between the three types of IS and their own properties, the linguistic status of IS is still unresolved. This explains why different stakeholders (linguists, interpreters, deaf people/organizations, etc.) are often reluctant to use the term "international sign *language*" and prefer the term "international sign" to refer to this communication system (e.g., Allsop et al., 1995; Correia et al., 2018; Hansen, 2016; Mesch, 2010; Moody, 2002).²⁶ The choice not to label IS as being a language is no paradox; as noted by Kusters (2020), deaf users of IS tend to have a prescriptive view of IS as if it was a fixed language, even though they suggest IS is not a language.

^{24.} e.g., feedback, for example when the interpreter sees puzzled faces in the audience.

^{25.} Simultaneous interpreting as opposed to consecutive interpreting; see the introduction chapter.

^{26.} One recent publication refers to IS as a language (see Rathmann & Müller de Quadros, 2023). We discuss this new label in the "Final discussion/conclusion" chapter of this manuscript.

One of the main reasons for the reluctance to see IS as a language is the fact that IS has heterogeneous forms that “[...] cannot [even] be compared to the relatively fixed pidgins based on spoken languages” (Hansen, 2016:19). In particular, the main heterogeneity in form comes from the use of the lexicon. Allsop et al. note that IS signers are unable to rely on “agreed signs: “In relation to lexicon it is difficult to justify the claim that IS is a language” (Allsop et al., 1995a, p. 187). Moody (2002) reports that the use of lexical signs depends on the language repertoires of each signer which differs from one signer to another.²⁷ In addition, the use of lexical signs depend on where the communication situation occurs (Nana Gassa Gonga et al., 2022), resulting in what has been referred to as the lexicon of IS being “impoverished” (Allsop et al., 1995, p. 187) and “limited” (R. McKee & Napier, 2002, p. 46; Rosenstock, 2007, p. 100).²⁸ This is why IS learners are often told not to focus on lexical signs (like ASL lexical signs, see Kusters, 2000) but to focus on other non-lexical resources.²⁹ These are known to be highly visual/iconic elements in comparison to lexical signs, in the sense that non-lexical resources resemble the referent; i.e. iconic and/or metaphoric motivation (Brennan, 1992; Taub, 2001). As a consequence, IS can be expected to contain fewer lexical signs, as by definition lexical signs are mostly language-specific and not shared between sign languages;³⁰ the use of lexical signs would not facilitate communication. Yet, while qualitative research highlights alternatives to lexical signs in IS interpreting (e.g. McKee and Napier, 2002), quantitative research reveals that lexical signs form the bulk of the composition of expository IS (e.g. Whynot, 2016).

Previous quantitative studies on national sign languages have unraveled their composition by providing the distribution of lexical and non-lexical manual signs. Concerning IS, the distribution of lexical and non-lexical signs is less clear. To the best of our knowledge, only two studies have attempted to unravel the composition of IS, both focus on expository IS. One is a Master thesis based on data of expository IS happening in France (Monteillard, 2001); the other a PhD thesis based on data of expository IS happening in South Africa (Whynot, 2016). Moreover, little is known about sign type distribution for cross-signing and IS interpreting. This study’s focus is on filling the knowledge gap for IS interpreting.

²⁷. Languages’ repertoire is to be understood as the languages one person knows.

²⁸. The terms “impoverished” and “limited” are further evaluated in Chapter 4 of this thesis

²⁹. Here, we do not focus on semiotic resources which include linguistic and non-linguistic elements (see Kusters, 2021).

³⁰. As of note, lexical overlap happens in sign languages; see also Börstell, 2023.

First, we provide the first sign type distribution of IS interpreting. Second, we *directly* compare this sign type distribution to an established national sign language (NGT). In this way we clarify whether IS behaves as an ‘outsider’ in the field of sign languages or, alternatively, an ‘insider’, where it behaves like a local sign language by revealing similar sign-type distribution pattern. We present the results from a collection of authentic-like data from two teams of interpreters working in parallel in IS and NGT.³¹ Moreover, we compared the sign type distribution of IS and NGT interpreting to data based on expository IS, ASL dataset, Auslan corpus, BSL corpus, SSL corpus and ISL corpus to further interpret the results. This broader comparison provides insights into whether and how IS differs from different national sign languages.

Sign type distribution in sign languages and IS

Sign type distribution of national sign languages

One of the main linguistic tools we use to gain insights in a language is to dive into its linguistic composition. For signed languages, this can be accomplished by differentiating the different manual sign types that makes up its discourse. We follow earlier studies by differentiating between the following sign-types: lexical signs, pointing signs, depicting signs, and fingerspelling forms (Johnston & Schembri, 1999; Fenlon et al., 2014; Börstell et al., 2016). Previous studies also included the sign-type gesture, which contained enactments and palm-up, amongst other gestures; we added palm-ups and enactments as separate sign types. Moreover, we added numbers as a separate sign type, whereas previous studies classified numbers as part of the sign-type lexical sign. Our decision was driven by the fact that informal observations suggested that number signs seem particularly prominent in IS interpreting.³²

So far, five studies have been conducted on sign type distributions of national sign languages at varying scales: ASL, Auslan, BSL, SSL and ISL.³³ The studies on Auslan, BSL and SSL are based on large datasets of language recordings (from 24,823 tokens for BSL to 54,506 tokens for Auslan) while the studies on ISL and ASL are based on smaller datasets (11,161 and 4111 tokens respectively); see Table 5. In addition, the types of register differ between

^{31.} We collected data similar to the interpreting setting in efsli conferences as presented in the Introduction Chapter.

^{32.} See our predictions in Part 4.

^{33.} Sign types are labelled “sign categories” in Fenlon et al. (2014) and Börstell et al., (2016).

the studies, so caution is warranted when comparing studies based on these datasets.

Table 5. Overview of sign type distribution studies for national sign languages and their data (including the number of manual sign tokens)

National Sign Language	Source	Register	Token (n)	Publication
ASL	Commercial videotapes	Formal, casual, narrative	4,111	Morford and MacFarlane (2003)
Auslan	Machine-readable corpus	Principally narrative	54,506	Johnston (2012)
BSL	Machine-readable corpus	Spontaneous and elicited conversational data	24,823	Fenlon et al. (2014)
SSL	Machine-readable corpus	Semi-spontaneous conversation and elicited narrative	44,786	Börstell et al. (2016)
ISL	Sub-dataset extracted from the Sign of Ireland (SOI) Corpus (machine-readable corpus)	Narrative and elicitation tasks	11,161	Smith and Hofmann (2020)

The main finding is that lexical sign is the most frequent sign-type composing the discourse, from 60.3% lexical signs for BSL to 87% for ISL (Figure 10).³⁴

³⁴. For ISL, the analysis is based on 11,161 tokens extracted from the SOI Corpus from which the 100 most frequent signs have been selected. Of these 100 most frequent signs, 87% are lexicalized.

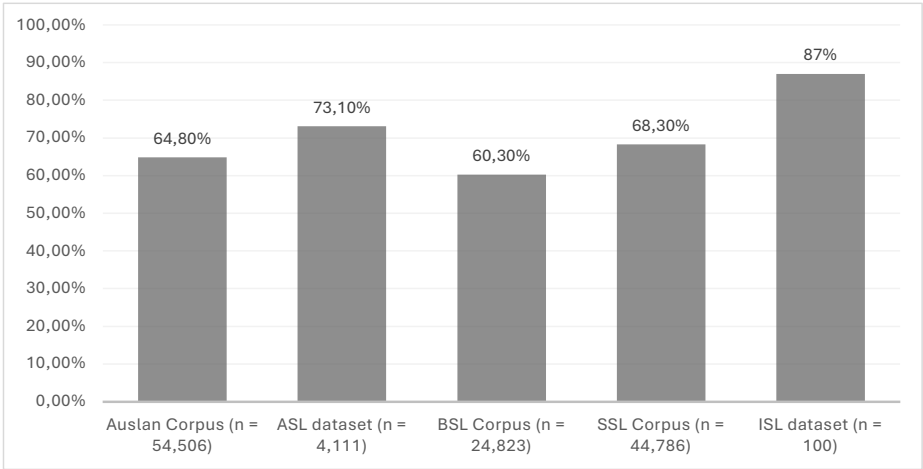


Figure 10. Comparing the percentage of lexical signs in five national sign languages ³⁵

The sign type distribution of expository IS

Previous studies on the sign type distribution of IS have only been based on a few thousand tokens. While large datasets of national sign language have been recorded and are accessible in Open-Access data archives, this is not the case for IS datasets (see Table 6).

Table 6. Overview of the sign type distribution studies for IS and their data

International signing communication	Source	Register	Token (n)	Publication
Expository IS, France	Lectures by deaf presenters	Formal	n/m	Monteillard (2001)
Expository IS, South Africa	Lectures by deaf presenters	Formal	7,033	Whynot (2016)

Interestingly, the results of the sign type distribution in expository IS are similar to those found in sign type distribution studies on national sign languages, as shown in Figure 11 and 12; the main sign type used in both is lexical sign. Monteillard (2001) found 74.48 % were lexical signs while Whynot (2016) reported 63.60% (see Figure 11).

^{35.} Auslan Corpus data from Johnston (2012); ASL dataset from Morford and MacFarlane (2003); BSL corpus data from Fenlon et al. (2014); SSL corpus data from Börstell et al. (2016); ISL dataset from Smith and Hofmann (2020).

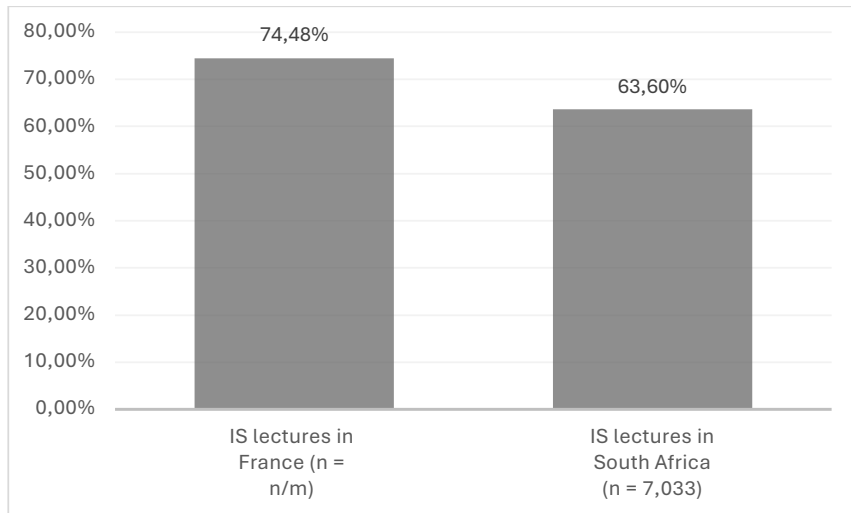


Figure 11. Comparing the percentage of lexical signs between IS lectures in France and in South Africa.

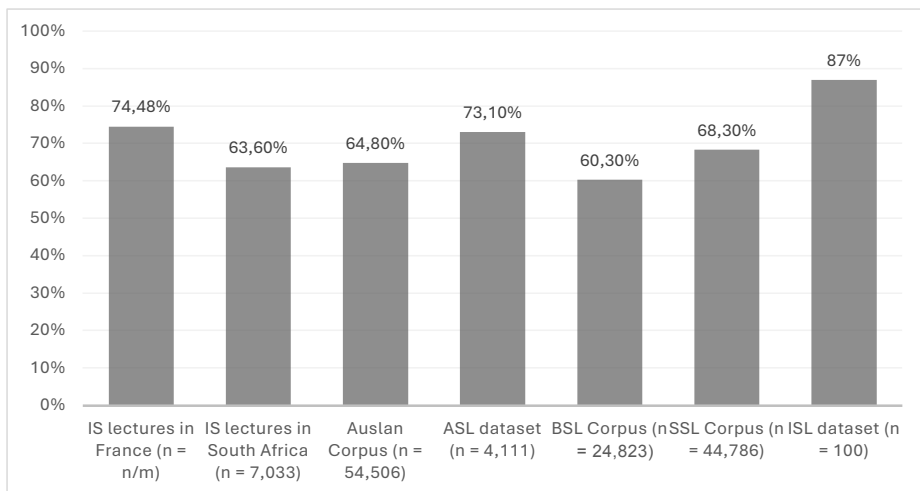


Figure 12. Comparing the percentage of lexical signs between expository IS and five national sign languages³⁶

³⁶. IS lectures in France, data from Monteillard (2001); IS lectures in South Africa, data from Whynot (2016); Auslan Corpus data from Johnston (2012); ASL dataset from Morford and MacFarlane (2003); BSL corpus data from Fenlon et al. (2014); SSL corpus data from Börstell et al. (2016); ISL dataset from Smith and Hofmann (2020).

The finding that expository IS is mainly composed of lexical signs comes as surprising as it has been argued that IS relies less on lexical resources, i.e. conventionalized items, than national sign languages. This commonly held view is based on qualitative studies from IS interpreting data (see McKee & Napier, 2002; Rosenstock, 2008). Both studies describe strategies used to interpret from spoken English to IS with a highlight on the reduction of lexical signs as IS core lexicon has not yet been defined. The authors state that IS interpreters are expected to rely more on non-lexical and highly-context dependent resources such as depicting signs to compensate for this lack of defined core lexicon. In line with this expectation, a quantitative study on depicting signs by Stone and Russell (2016) showed that depicting signs are more present in IS interpretation than in ASL and BSL interpretation.³⁷ Despite this difference in the use of depicting signs, quantitative studies on the sign type distribution of IS (Monteillard, 2001; Whynot, 2016) show that IS is mainly composed of lexical signs (more than 50%), which does not deviate from how lexical signs are used in multiple national sign languages.

Monteillard (2001) studied the sign types use of four presenters (deaf and hearing, from France, Denmark, and the US) between 1993 and 1999 for a master thesis.³⁸ She focused on three main sign types, inspired by the linguistic descriptive framework of sign languages from the French linguist Cuxac (2000). She distinguishes (1) standard signs (the equivalent of fully lexical signs in Johnston and Schembri's framework, 2010), (2) transfer structures, and (3) pointing signs (called partly-lexical signs in Johnston and Schembri's framework (2010) or non-lexical signs in Hodge and Johnston's (2014)). Even though Monteillard did not provide details on the amount of data analyzed (minutes or tokens), percentages were provided (Table 7) showing that almost 75% of the sign types of expository IS are "standard signs", i.e. (fully) lexical signs.

^{37.} Noteworthy: the difference in the use of depicting signs may be based on the contrast between IS and other national sign languages, i.e. ASL and BSL, but this may also be due to differences between deaf and hearing interpreters. Hearing interpreters used ASL and BSL and deaf interpreters, IS. In addition, we know that deaf/non-deaf opposition can be relevant in the interpreting preparedness as shown by output from Stone (2009) when comparing deaf and non-deaf translators/interpreters working on TV.

^{38.} Monteillard uses "categories de signes" in French which can be literally translated as "sign categories" in English. However, as a loose translation and in order to be consistent throughout the article, we continue to use the term "sign types".

Table 7. Distribution of sign types in expository IS in France following Cuxac's linguistic framework (Monteillard, 2001)

Sign types	Percentage of sign types in expository IS (<i>n</i> = not mentioned)
Standard signs (equivalent of fully lexical signs)	74.48%
Transfer structures (equivalent of depicting signs and constructed actions)	9.60%
Pointing signs (equivalent of one type of partly-lexical signs)	15.80%

In Whynot's (2016) study, quantitative results on expository IS are based on 101 minutes and 7,033 tokens of manual signs from thirteen deaf presenters from Europe, Oceania, Asia, Africa, and America, collected at an international conference, in 2011. To distinguish the linguistic sign types, Whynot (2016) followed Johnston and Schembri's (2010, 2007, 1999) linguistic framework and distinguished more sign types than Monteillard: fully lexical signs, fingerspelling, name signs, pointing signs, depicting signs, and non-lexical gestures. In addition, Whynot (2016) coded periods of constructed actions composed inside of them of different sign types.

Similarly, the sign type distribution by Johnston (2012) for Auslan and by Fenton et al. (2014) for BSL followed Johnston and Schembri (2007) to determine the sign types; constructed actions periods being part of non-lexical gestures. Using the same framework to break down the sign types allows comparisons between the studies (see Table 8).³⁹

³⁹. The sign type distribution of expository IS by Monteillard (2001) was not included in Whynot's study. The studies on SSL and ISL were also not included in her comparison, given that these are not yet published.

Table 8. Comparison of sign type distributions between IS lectures, Auslan, ASL and BSL (Whynot, 2016:148)

Sign types	Expository IS (IS lectures) (n = 7,033)	Auslan Corpus (n = 54,506)	ASL dataset (n = 4,111)	BSL Corpus (n = 24,823)
Fully lexical sign (including numbers)	63.6%	64.8%	73.1%	60.3%
Fully lexical fingerspelling ⁴⁰	1.74%	5.0%	6.4%	3.0%
Fully lexical name signs	1.74%	0.25%	2.3%	n/a
Partly lexical pointing signs	14.5%	12.0%	13.8%	23.0%
Partly lexical depicting signs	10.2%	11.0%	4.2%	2.3%
Non-lexical gesture	9.0%	6.5%	0.2%	8.9%

Whynot’s results (2016) inform us about the composition of IS but do not reveal whether IS is composed differently compared to national sign languages. Her comparison of the different sign type distributions between expository IS and national sign languages (2016) has to be interpreted with caution as the data types are greatly different, ranging from narrative to non-narrative, different sizes, etc. (Table 8). Therefore Whynot’s expository IS dataset (2016) does allow *direct* comparison of IS with national sign languages.

Initially, Table 8 suggests that IS does not act as an outsider in the field of sign languages given the similar distribution across several sign types for at least one sign language. In addition, the main sign type is lexical sign for all distributions, in contrast to expectations for expository IS as IS is known to rely less on lexical resources and more on partly-lexical and non-lexical resources (see Moody, 2002 and Stone and Russell, 2016). However, these data cannot confirm that IS behaves similarly to national sign languages as the comparison of the sign type distribution was based on different registers and different topics (i.e. comparison between unrelated datasets).

In addition, it is not possible to directly compare the same discourse in expository IS and any expository national sign language without adding an extra step of interpretation. Earlier studies on the sign type distribution of IS focused on expository IS which does not allow direct comparison with national sign languages. Focusing on interpreting allows a direct comparison as interpretation is from the same source discourse. With the opportunity to

⁴⁰. To not be confused, here “fully lexical fingerspelling” refers to (regular) fingerspelling and not what is commonly called “lexicalized fingerspelling” in the literature, e.g. ok. Note that precise definitions of the different sign types are given in section 5.2 “Sign types”.

make a direct comparison between the same content due to the same (spoken) source discourse, we decided to collect our own dataset and compare the production of IS to a national sign language, produced at the same time. As an automatic consequence, the production of IS interpreting and national sign language interpreting contains the same register, topics and content.

Our study provides a *direct* comparison of the sign type distributions between IS and a fully-fledged national sign language (NGT) in order to (a) provide a sign type distribution of IS in another context, i.e. IS interpreting, and (b) *directly* compare IS interpreting sign type distribution to NGT interpreting sign type distribution.

Comparing IS interpreting and NGT interpreting sign type distribution

In addition to our study, one other has touched upon a comparison between IS and NGT interpreting. De Wit et al. (2021) directly compared preparation strategies between IS and NGT interpreters.⁴¹ Prior to the assignment, interpreters discuss the content of what they are going to interpret and search for the meaning of words based on content presenters have passed on to them in the *preparation phase* (see Diriker, 2004; Gile, 2009). De Wit et al. (2021) studied this preparation phase and identified the major topics discussed among the team of IS interpreters and NGT interpreters. Some topics are similar between the teams (source concept meaning and specific attention to the comprehension of their respective audience) and some differ.⁴² One of the major differences is the emphasis on the linguistic resources used to produce the output interpreting in NGT and in IS. De Wit et al. (2021) report that IS interpreters attempt to limit the use of lexical signs; they tend to “try signed concepts” while NGT interpreters tend to search for the “correct NGT signs” (De Wit et al., 2021, p. 51).

To achieve “Trying signed concepts”, IS interpreters aim to “[...] make their interpretation as visual as possible” (De Wit et al., 2021, p. 51) by relying on the partly-lexical and non-lexical resources available in signed languages. In contrast, using the “correct NGT signs” for NGT interpreters relates to the aim of transmitting the nuances inherent to each terminology term. Consequently, during their preparation, NGT interpreters rely more on the lexical resources

⁴¹. This study is based on a specific part of this same global dataset. While De Wit et al. (2021) focus on the preparation part, our study focuses on the interpreting assignment itself.

⁴². See the introduction chapter for the definitions of the terms “source” (versus “target”).

available in signed languages; in particular by using the online NGT dictionary.⁴³ For De Wit et al. (2021), knowing whether IS interpreters' output is actually aligned to their prepared strategy, in the sense that they planned to minimize the use of lexical signs, is outside their study scope; this is our starting point.⁴⁴

IS interpreters thus have no lexicon or online dictionary to fall back on. IS communication is not recognized as an established sign language, mostly due to its unstable and ill-defined core lexicon, as described earlier. IS interpreters favor other manual linguistic resources present in signed languages, namely partly-lexical and non-lexical resources, which might be hidden behind the phrase "trying signed concepts" (Wit et al., 2021b, p. 51).

We note differences between the findings of qualitative studies and those based on quantitative studies on IS communication. The qualitative studies show that IS communication reduces the use of lexical signs in order to be widely understood, while quantitative studies show that lexical signs are the main elements of IS composition. Therefore, we see a discrepancy between the unsystematic qualitative analysis of what IS is supposed or known to be (prescriptivism - less use of lexical signs)⁴⁵, and what IS communication is actually composed of based on systematic quantitative results (descriptivism - between 63% and 74% of lexical signs).⁴⁶

Research question and predictions

Following quantitative studies on expository IS (Monteillard, 2001 and Whynot, 2016) and qualitative studies on IS interpreting (R. McKee & Napier, 2002; Moody, 2002; Rosenstock, 2008; Stone & Russell, 2016b; Wit et al., 2021b), we will provide a *direct* quantitative comparison of the sign type distribution of interpretations by IS and NGT interpreters. Our comparison is direct in the sense that the both sets of interpreters were simultaneously interpreting from the same source discourse in spoken English, at the same time, in the same lecture hall (see section 5.1 "Dataset" for details). This allows us to observe whether IS composition differs from NGT.

^{43.} NGT dictionary: <https://www.gebarencentrum.nl/> (visited 29 April 2024).

^{44.} See the Introduction chapter for the difference between "strategy" and "tactic" according to Gile (2009).

^{45.} Particularly less use of ASL lexical signs (see Kusters, 2020).

^{46.} See Figure 11.

We address the following research question to observe whether IS behaves differently than NGT.: What is the sign type distribution of IS interpreting compared to NGT interpreting? We are particularly interested in the use of lexical signs, which is claimed to be reduced in IS and a point of debate concerning whether IS is a language or not. As IS is highly-context dependent and given insights from previous studies (e.g. McKee and Napier, 2002), we expect a higher use of context-dependent linguistic resources such as depicting signs, pointing signs and enactments with less use of context-dependent sign types such as lexical signs and fingerspellings, in comparison to NGT.⁴⁷

Method and material

Dataset

Event To investigate the sign type distribution of IS and NGT interpreting in a direct comparison, we compared the interpreting assignment from the same source discourse. In 2019, we invited two academic speakers to deliver a lecture on their own expertise to a lay audience at Radboud University, the Netherlands (Figure 12). The first lecture, given by a biologist, was titled “The biodiversity crisis and the global conservation assessments”; the second, given by a cultural anthropologist, was “Communication with the dead”. Each lecture lasted almost 1 hour: about 5 minutes of introduction by the host speaker, 40 minutes of presentation by the lecturers, and 10 minutes of audience interaction.



Figure 13. Data collection of the interpreted lecture in IS and NGT, Nijmegen, May 2019

⁴⁷. See part 5.2 “Sign types” for the presentation and definitions of the different sign types used.

The lectures were in spoken English and simultaneously interpreted to NGT and IS, in parallel.⁴⁸ The interpreters worked in a team of two for the same language, as is usual for this type of setting to ensure a high quality of interpretation; two NGT interpreters (coded as NGT 1 and NGT 2) and two IS interpreters (coded as IS 1 and IS 2).⁴⁹ For both lectures, the NGT 1 interpreter worked in parallel with the IS 1 interpreter, interpreting the same chunk of discourse; similarly, the NGT 2 interpreter worked in parallel with the IS 2 interpreter. Table 9 presents the relay setting associated with the metadata for each interpreter.

Table 9. Metadata for the NGT and IS interpreters by relay

	Relay "NGT 1/IS 1"		Relay "NGT 2/IS 2"	
	NGT 1	IS 1	NGT 2	IS 2
Professional experience in interpreting (in years)	7	20	2.5	6
Native spoken languages	Dutch	English	Dutch Hungarian	Spanish Basque
Native sign language	n/a	ASL	n/a	n/a
Non-native sign languages and IS	NGT	LSF IS	NGT	LSE IS

While one interpreter was actively interpreting (the *lead* interpreter), their colleague monitored the interpretation and supported the interpreter (the *monitor* interpreter). We refer to each effective *lead* interpreting turn as a *relay* (see Hoza (2010) and Napier et al. (2006) for different terminology on team interpreting). Both IS and NGT interpreter teams relayed after 15 minutes of interpreting as is common in sign language interpreting (see Brück, 2011 and Roy & Napier, 2015 for shift time recommendation). Figure 13 illustrates the pair of lead/monitor interpreters for the NGT team.

⁴⁸. Note that both speakers were non-native English speakers.
⁴⁹. This coding scheme for the interpreters corresponds to that used in De Wit et al. (2021). Therefore, the reader can easily make connections between our findings and theirs.



Figure 14. NGT interpreters working in pairs; one actively interpreting (the lead interpreter) and one monitoring the lead (the monitor interpreter)

The event was organized for the specific purpose of our research. Therefore, access to the lectures was on invitation only. We invited ten deaf Dutch participants as part of the NGT audience, with an IS audience being a mix of deaf participants from China (five with CSL as native language), from Flanders (three with VGT as native language),⁵⁰ from Wallonia (five with LSFB as native language), and from the Netherlands (five with NGT as native language); see Table 10.

Selection of participants

We first recruited a deaf local coordinator for each group of participants, and asked this coordinator to search for participants who matched our criteria: deaf people fluent in their national sign language with little to no exposure to IS before the event. We selected this criterion to push the two IS interpreters to show a lot of “creativity” when bringing their message across. In addition, we selected deaf participants with a limited knowledge of English.⁵¹ This latter criterion dismissed one of the main factors that facilitates IS communication according to Hiddinga and Crasborn (2011).

^{50.} We first invited five deaf VGT participants but two out of them were not able to make it at the last minute.

^{51.} However, this “little knowledge of English” criterion has to be nuanced when we observe the results from Bierbaumer and Crasborn (2025) who found English mouthing and fingerspelling used by the Dutch and Chinese deaf participants.

Table 10. Metadata of the IS audience

Country of residence	National Sign Language	Participants
China	CSL (<i>Chinese Sign Language</i>)	<i>n</i> =5
Belgium-Flanders	VGT (<i>Vlaams Gebarentaal</i>)	<i>n</i> =3
Belgium-Wallonia	LSFB (<i>Langue des Signes Francophone de Belgique</i>)	<i>n</i> =5
The Netherlands	NGT (<i>Nederlands Gebarentaal</i>)	<i>n</i> =5

To be able to observe the use of IS in this case of no shared languages (spoken or signed), we informed the IS interpreters about the low level of knowledge of English and about the background of the audience. In this specific setting, we expected the IS interpreters to be less reliant on their use of English fingerspelling.⁵²

All the participants – presenters, interpreters, and deaf audience – gave consent to participate in this study. The consent forms were written in each participant group’s written languages (i.e. English, French, Chinese, Dutch) and the deaf coordinators translated them in their respective sign language (i.e. CSL, NGT, VGT and LSFB).⁵³

In addition to the deaf audience, 12 hearing people (fellow researchers from Radboud University) were invited. These researchers were not fluent in any signed language and listened to the lectures in English. Figure 14 illustrates the setting of this event. The configuration of the event was such that the IS audience could not observe the NGT interpreters, nor could the NGT audience observe the IS interpreters, thanks to black screens positioned next to the interpreters. In total, we recorded 125 minutes of IS interpreting data and 125 minutes of NGT interpreting data (58 minutes for lecture 1 and 67 minutes for lecture 2).⁵⁴

^{52.} Mouthing is also a point of language contact between IS and English. Yet, here we have focused and coded manual activity. For mouthing coding in (IS) cross-signing, see Bierbaumer and Crasborn (2025).

^{53.} See Appendix 3 for the content of the consent form; English template.

^{54.} Numbers of the minutes are rounded off.

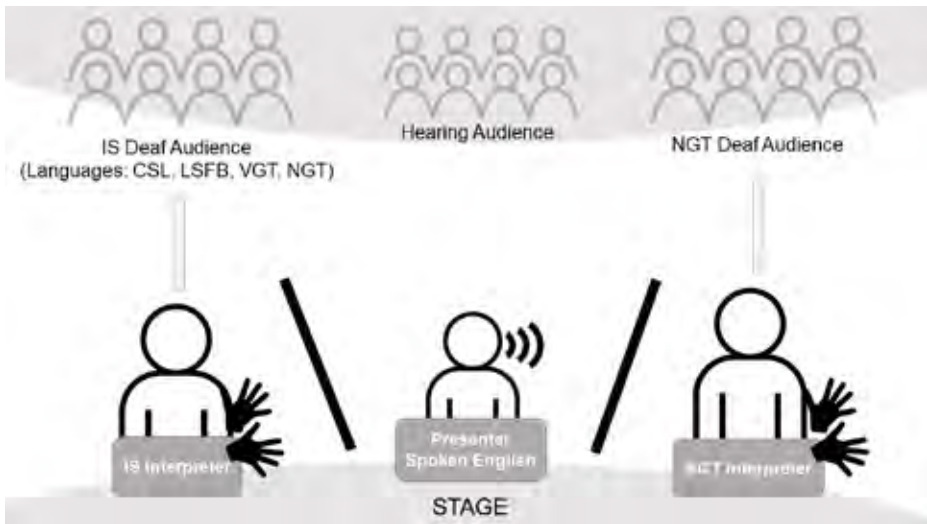


Figure 15. Setting of the data collection of IS and NGT interpreting, Radboud University, Nijmegen, May 2019

Sign types

To be systematic and aligned with other IS studies, we exclusively annotated the manual parts of the signs for the sign type distribution analysis, allowing comparisons with these IS data sets. We mainly used the sign types following Fenlon et al.'s classification, adding three sign types: "numbers" (part of the sign type "lexical sign" in Fenlon et al.'s work), "enactments", and "palm-ups" (both part of the sign type "gesture" in Fenlon et al.'s work). Moreover, we included the remaining parts of the Fenlon et al.'s sign type "gesture" in the "lexical sign" sign type for our study, given the conventionalized link between form and meaning. Also, we did not use the sign type "buoy" and did not code constructed actions periods (we codes what was inside these constructed actions periods). Table 11 summarizes the comparison between Fenlon et al.'s (2014) sign type nomenclature and that used in our study.

Table 11. Comparing the sign type nomenclature from Fenlon et al. (2014) with the sign type nomenclature used in this study

Fenlon et al.'s sign type nomenclature	Correspondence in this study
Lexical signs (included sign names ⁵⁵ and numbers)	Lexical signs (included name signs) Numbers
Fingerspelled forms (included sign names)	Fingerspellings Lexical signs (included name signs)
Classifier signs	Depicting signs
Gestures (including palm-up)	Lexical signs Palm-up
Pointing signs	Pointing signs
Other	Unclear
Buoys	Not annotated
Constructed actions periods	Not annotated

In brief, we categorized 7,105 sign tokens according to the following sign types: *lexical signs*, *depicting signs*, *pointing signs*, *fingerspellings*, *enactments*, *palm-up*, *numbers* and *unclear*.⁵⁶ The category 'unclear' contains the signs which do not fall into one the other seven sign types, signs not sufficiently visible and false starts. Below, we explain each sign type in detail.

Lexical signs: These are conventionalized and regular in form and the meaning (Cuxac, 2000b; Johnston & Schembri, 2007); the specific combination of the different components of the signs (handshape, orientation, direction, movement, and facial expression) have a fixed and specific meaning. The comprehension of lexical signs depends on specific knowledge stored in the mental lexicon of the interlocutor; these signs can be understood out of context.⁵⁷ Thus, the meaning of a lexical sign is given rather than generated based on the context, in contrast to a depicting sign (see below).

Unlike various national sign languages such as NGT, Auslan, BSL, ASL and LSF, for all of which the core lexicon has been established, there is no already-

^{55.} "Sign names are either subtypes of lexical signs or are derived from fingerspelling (with varying degrees of lexicalization). Therefore, for the purposes of this study, and unlike previous sign language studies, we categorized sign names as either lexical signs or as fingerspelling forms" (Fenlon et al., 2014, p. 198).

^{56.} 3211 tokens for IS interpreting and 3894 for NGT interpreting (see Table 28 below).

^{57.} To be more nuanced, words as lexical signs can be understood out of context even though polysemantic words/signs exist and context may be relevant to understand the specific meaning of any given word/sign.

annotated corpus of IS. Therefore, our coding is based on linguistic criteria and our interpretation of the signs in context and not on our knowledge of what is considered as "IS core lexicon".

In the type "lexical sign", we included sign names (as a given sign for a person or location) and fixed use of fingerspelling (see below). Lexical signs include emblematic gestures, also referred to as 'gesture-like sign' by Fenlon et al. (2014) or as "semantic gestures" by Brennan (1992).⁵⁸ These emblematic gestures are conventionalized in form and meaning. For this reason, they fall under lexical signs according to our definition. Despite this, we are aware of the lack of consensus on the categorization of gesture types among sign language linguists (Fenlon et al., 2019; Goldin-Meadow & Brentari, 2017; Occhino & Wilcox, 2017).

Several signs could be annotated in various ways. Even though we only needed to label the manual activity to answer our research questions, non-manual activity (facial expressions, eye-gaze, head and body movements) is clearly part of signed languages and guided us in discriminating linguistic elements; observing mouth pattern and eye gaze may provide information on the sign types. For lexical signs, mouth patterns are likely to accompany the manual activity and the eye gaze is usually directed toward the interlocutor and not to the hands, unlike depicting signs (see Cuxac, 2000; Engberg-Pedersen, 1993). The observation of mouth patterns and eye gaze is key to determining between lexical signs and depicting signs, for instance.

Compounds, (two signs bonding into one semantic unit) were annotated as one sign (see Klima & Bellugi, 1979; Pfau et al., 2012). This was also true for the formation of plural noun forms – which may take the form of reiterations of the base form; these formations have been annotated as one sign.

In summary, if a sign appears to have a non-predictable (conventionalized) form/meaning relationship and does not fall in any of the other sign types, we annotated it as a lexical sign.

Depicting signs: These are linguistic units with a partly generated meaning, as opposed to the given/conventionalized meaning of lexical signs. Depicting signs depict the form, the location, the size and shape, and/or the movement of the entity. The handshape of the depicting sign is determined by the entity

⁵⁸. Quoted by Johnston & Schembri (1999).

whose movement or location is expressed (for more details, see Cormier et al., 2012; Liddell, 2003). The comprehension of depicting signs stems from the addition of its meaningful components which, in contrast to lexical signs, can be created on the spot. Moreover, the components can change when the meaning to be expressed changes. Although lexical sign may also involve meaningful linguistics units, the combined components remain the same (unlike depicting signs), given that the combined units have one conventionalized meaning (see below “Lexical sign”).

As mentioned, eye gaze direction is a feature that can help to discriminate whether a unit is a depicting sign or a lexical sign. For depicting signs, the eye gaze is often on the hand as opposed to toward the addressee; this is generally the case for lexical signs. Figure 15 shows the contrast between a lexical sign and a depicting sign using the same handshape; the “two non-spread fingers”.



Figure 16. Lexical sign INTERNATIONAL versus depicting sign with the handshape “two non-spread fingers”

Enactments: These correspond to embodied actions, namely the reproduction or the imitation of a position or movement of a referent. Like depicting signs, enactments are strongly context-dependent and devoid of lexically specified form or meaning. Enactments may involve both manual and non-manual elements (Cormier et al., 2015; Metzger, 1995). However, as mentioned, we focused on the manual elements. Therefore, we annotated enactment only if the hands were taking part. If only the body was involved but the hands were

not enacting anything, then the annotation followed what the hands were producing, other than enacting.

Pointing signs: These are manual movements directed to a specific area; they may fulfill the function of a locative, a determiner, or a possessive pronoun (see Johnston, 2013). We annotated pointing signs regardless of the handshake or palm orientation such as one finger or a flat hand, with palm up or palm down, etc.

Fingerspelling: This refers to the spelling of spoken language words using a manual alphabet to parallel written letters.⁵⁹ Lexicalized fingerspelling forms have been annotated as lexical signs, mainly based on Cormier et al.'s (2008) work who distinguish fingerspelling from fingerspelling forms that have become a fingerspelled loan (lexical) sign (referred to as nativisation process). They define several criteria, including frequency of the fingerspelling, letters dropped over time, adaptation of the fingerspelling form to the rules of the native lexicon, leading to the distinction between regular fingerspelling form and a fully lexicalized fingerspelling form which have become part of the core sign language lexicon. Our guidelines follow these criteria (see Appendix 2)⁶⁰.

Palm-up: this is a manual activity where the palms of the hands face upward. This is termed a function sign (van der Kooij et al., 2006) and is the only function sign type we annotated.⁶¹ As palm-up is known frequently used in signed languages (see (R. McKee & Wallingford, 2011)), we did not want to skew the results and "artificially" raise the percentage of lexical signs/gesture. While some researchers label palm-up as gesture (Fenlon et al., 2014) and others as a lexical sign (R. McKee & Wallingford, 2011), we decided to single out palm-up as a separate entity.

Numbers: These are signs given to numeral elements. We coded complex numbers (like '538', for instance) as one single number.

Unclear: We termed a situation 'unclear' where the camera was not recording the interpreter properly, for example they were partially out of view, or to false signing starts, and any sign that did not fall under any of the categories decided beforehand.

⁵⁹. Here, the spoken language is English.

⁶⁰. See part 5.3 "The annotators and the coding process" for our coding method.

⁶¹. In contrast to content sign types which give the meaning of the signing dataset, function signs have a grammatical function (see Napier, 2016).

Unlike Fenlon et al. (2014), we did not separately annotate the occurrence of buoys (Liddell, 2003). Buoys inform us on how the sign is used, i.e. how the discourse is constructed (function) and not composed (content). Buoys or weak hand holds, as coined by Kimmelman et al. (2016), are the “[...] spreading of the non-dominant hand that fulfils the discourse function of highlighting information” (Cormier et al., 2016, p. 37). Our interest was whether this sign was used as a lexical sign; not whether this lexical sign was used as a buoy. Therefore, in this study, we categorize buoys under one of the other sign types.

The annotators and the coding process

The different sign types were annotated using ELAN software (Crasborn & Sloetjes, 2008). We first established a controlled vocabulary list to avoid typing errors, which would lead to wrong results. This means that the annotators were only able to select an annotation within this fixed list of sign types (see Figure 16).

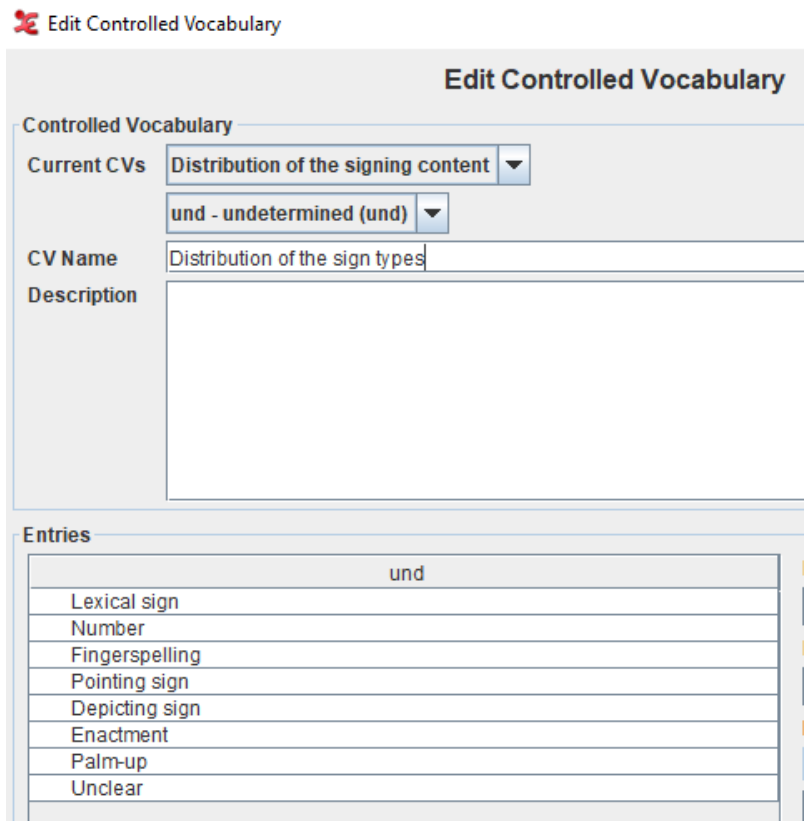


Figure 17. Screenshot of the controlled vocabulary list in ELAN software for IS and NGT interpreting datasets

We annotated the initial 10 minutes of each interpreter's relay for each lecture and each team of interpreters. In total, we annotated 80 of the total 250 minutes of collected data; 40 minutes of 125 for IS interpreting and 40 minutes of 125 for NGT interpreting. This corresponds to 3,894 tokens for NGT interpreting and 3,211 for IS interpreting. All our annotated data is available on request for researchers at The Language Archive (<https://hdl.handle.net/1839/48bc51ab-9f7e-4c30-8869-461b390a4f43>). Table 12 summarizes the data collected, annotated and the overall tokens.

Table 12. Overview of all collected and annotated data and tokens⁶²

	Collected IS and NGT data	Annotated IS data	Annotated NGT data
Lecture 1	58 min	10 min – IS 2 <i>n</i> = 764	10 min – NGT 2 <i>n</i> = 975
		10 min – IS 1 <i>n</i> = 839	NGT 1 ⁶³ <i>n/a</i>
		IS 2 <i>n/a</i>	10 min – NGT 2 <i>n</i> = 1,071
Lecture 2	67 min	10 min – IS 1 <i>n</i> = 837	10 min – NGT 1 <i>n</i> = 903
		10 min – IS 2 <i>n</i> = 771	10 min – NGT 2 <i>n</i> = 945
Total	125 min	40 min <i>n</i> = 3,211	40 min <i>n</i> = 3,894

The different sign types were annotated in parallel, by two signers. One hearing signer (AN) with an LSF interpreting background, and experience producing and perceiving IS, annotated the IS part. One deaf signer (TU) with NGT as a native language annotated the NGT part.⁶⁴

In general, for the annotation process, we distinguished right hand (R) and left hand (L), as shown in Figures 17 and 18. We annotated the dominant hand⁶⁵ for each sign, even if it was produced with two hands. We used the tier for the non-dominant hand when the interpreter was signing two different signs

^{62.} Numbers of the minutes are rounded off.

^{63.} Due to a miscommunication among annotators, NGT 1 interpreter has not been annotated in lecture 1. Read further in this section for detailed explanations.

^{64.} Note that during the annotation process, I, as a hearing annotator, could access the source discourse in spoken English. I did not annotate while listening to the source text; however for rare cases of disambiguating sign types, I took the liberty to refer to the audio source text.

^{65.} Here, all the interpreters were right hand dominant.

simultaneously or when the interpreter held a sign with the right hand (buoy) and pointed with the left hand.⁶⁶

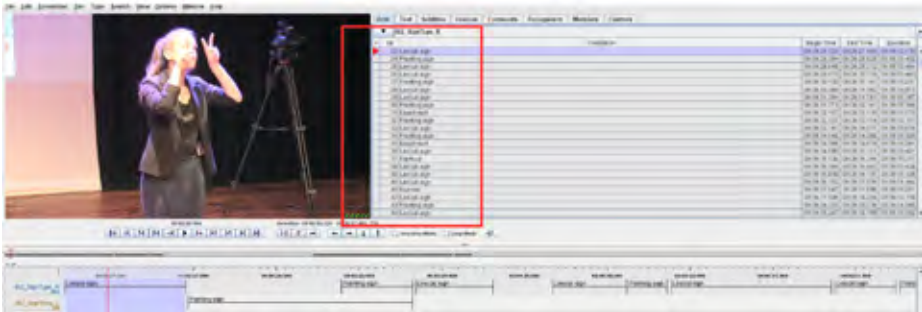


Figure 18. Screenshot of an annotated ELAN file for IS interpreting, detailing the coding scheme

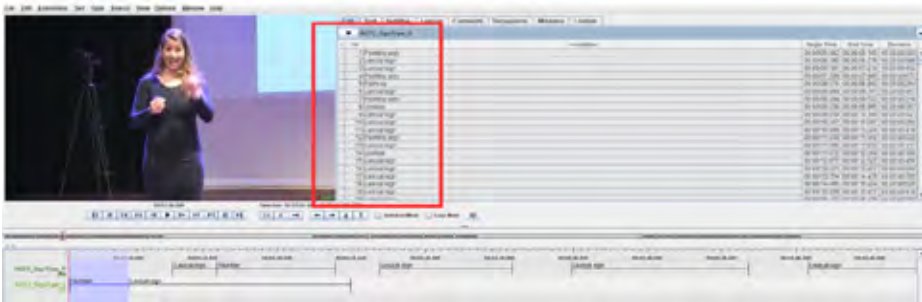


Figure 19. Screenshot of an annotated ELAN file for NGT interpreting, detailing the coding scheme

The annotation process and the reliability coding of the second lecture IS and NGT interpreters, ran smoothly. For this lecture we compared the IS 1 and NGT 1 interpreters and IS 2 and NGT 2 interpreters, interpreting the same chunk of discourse respectively (see Table 13).

^{66.} See section 5.2 “Sign types” for buoy. Instead of coding buoy directly, we coded the type of buoy e.g., lexical sign, depicting sign, etc.

Table 13. Overview of the coding process for lecture 2

Coding process for lecture 2				
	Same source text		Same source text	
	First relay		Second relay	
Initial plan				
Interpreter	NGT 1	IS 1	NGT 2	IS 2
Coding	✓	✓	✓	✓
Actual plan				
Interpreter	NGT 1	IS 1	NGT 2	IS 2
Coding	✓	✓	✓	✓

For the first lecture, a misunderstanding occurred among the annotators. Instead of annotating the NGT 1 interpreter during the second relay, the NGT annotator annotated the NGT 2 interpreter during the third relay. Therefore, the comparison could not be made as initially planned between NGT 1/IS 1 interpreters on the same source text. Instead we partly compared the same source text (i.e., the first relay) with a different source text (relays two and three within the same source lecture). The source remains the same for all data, i.e. the same lecture, therefore, this alteration still allows for a strong comparison between IS and a national sign language. Despite this deviation from the initial plan, we still achieved the same amount of data per language (IS and NGT); NGT 1/second relay coding was replaced by NGT 2/third relay coding (see Table 14).

Table 14. Overview of the coding process for lecture 1

Coding process for lecture 1						
	Same source text		Same source text		Same source text	
	First relay		Second relay		Third relay	
Initial plan						
Interpreter	NGT 2	IS 2	NGT 1	IS 1	NGT 2	IS 2
Coding	✓	✓	✓	✓	✗	✗
Actual plan						
Interpreter	NGT 2	IS 2	NGT 1	IS 1	NGT 2	IS 2
Coding	✓	✓	✗	✓	✓	✗

In addition, the results of the NGT interpreters for both lectures are similar (see Tables 16 to 19, part 6). Given that coding is highly time-consuming and after the re-assuring similarity between the data for each lecture, we decided to base our analysis on the existing coding.

Inter-rater reliability coding

To calculate inter-rater reliability, two signers annotated the sign types for the first minute of each interpreter for both lectures, which corresponds to 10% of the 80 minutes of annotated data. One hearing signer (OC) who has an NGT interpreting background, re-annotated one minute per NGT interpreter for both lectures (4 minutes).⁶⁷ In parallel, deaf signer TU similarly re-coded 4 minutes of the IS interpreting; 1 minute per interpreter and per lecture. To avoid bias, the two annotators had no access to the first annotation files.

An inter-rater reliability analysis was performed using the internal Kappa (k) tool in ELAN. The coding was not made with the aim to be precise in terms of time-code; therefore, we disregarded the length of the annotations for the calculation of the inter-rater reliability. For that reason, the required percentage of overlap between two annotations was set at 51%. We applied the calculation separately for the left and the right hand of each participant, and separately for each lecture.⁶⁸

The inter-annotator agreement of the sign types was adequate (Kappa values between 0.80 and 1.0) for both language combinations: for IS interpreting (lecture 1 and 2), it scored $k = .90$, $p < .001$ and for NGT interpreting (lecture 1 and 2), $k = .82$, $p < .001$ (see Field, 2013; Viera & Garrett, 2005).

Results

Based on our literature review, we hypothesized a greater use of lexical signs and fingerspelling in NGT interpreting than in IS interpreting, with more use of depicting and pointing signs and enactments in IS interpreting than in NGT interpreting. In Table 15, we present the overall results based on the two interpreters per language across the two lectures.⁶⁹

⁶⁷. Professor Onno Crasborn is the main dissertation supervisor.

⁶⁸. Note that inter-rater reliability value is missing for the NGT 1 interpreter in the lecture 1 due to the reasons explained in the previous section 5.3 "The annotators and the coding process".

⁶⁹. Numbers have been rounded off to one decimal.

Table 15. Sign types distribution in IS and NGT interpreting averages for lecture 1 and lecture 2

Sign Types	IS Interpreting <i>n</i> = 3211	NGT Interpreting <i>n</i> = 3894
Lexical signs	59.9%	80.2%
Pointing signs	18.6%	11.2%
Depicting signs	7.6%	2.4%
Palm-ups	6.5%	2.4%
Numbers	2.9%	1.5%
Enactments	2.9%	1.0%
Fingerspellings	0.3%	1.1%
Unclear	1.2%	0.6%
Sum	100.0%	100.0%

As expected, IS interpreters relied less on highly conventionalized forms such as lexical signs and fingerspelling than NGT interpreters. IS interpreters relied more on visual and highly context-dependent forms such as depicting signs, pointing signs, and enactment.

However, we observed some unexpected results. Firstly, we did not expect large differences between the percentages of palm-ups and numbers between IS and NGT. Based on previous work (e.g., Seleskovitch & Lederer, 1997), numbers are expected to be interpreted literally. Therefore, if a number appeared in the source text then it was likely to appear in the target text. There is no obvious reason for our numbers percentage to be higher in IS than NGT, given the interpreters are interpreting from the exact same source text. Secondly, we know that palm-up is a top-ranked sign types in several sign languages (see McKee and Wallingford, 2011), yet we did not expect its percentage to be so high in IS in comparison to NGT.

Results per lecture and per interpreter

In this section in Tables 16 to 19, we present the sign type distributions for IS and NGT interpreters per lecture and per interpreter. For lecture 1, the interpreters took turns as follows: NGT 2/IS 2 started (first relay), then NGT 1/IS 1 (second relay), and so on. For lecture 2, it was the other way around; NGT 1/IS 1 interpreters started and NGT 2/IS 2 interpreters continued.

Results for lecture 1

Table 16. Distribution of the sign types for the IS 2 and NGT 2 interpreters' first relay - Lecture 1

Sign types	IS 2 interpreting <i>n</i> = 764	NGT 2 interpreting <i>n</i> = 975
Lexical signs	56.5%	76.6%
Pointing signs	20.4%	12.4%
Depicting signs	8.8%	2.8%
Enactments	5.1%	0.2%
Palm-ups	4.2%	2.2%
Numbers	3.1%	2.4%
Fingerspellings	0.5%	2.3%
Unclear	1.3%	1.2%
Sum	100.0%	100.0%

Table 17. Distribution of the sign types for the IS 1 interpreter's second relay and NGT 2 interpreters' third relay - Lecture 1

Sign types	IS 1 interpreting <i>n</i> = 839	NGT 2 interpreting <i>n</i> = 1071
Lexical signs	57.5%	80.6%
Pointing signs	16.1%	12.4%
Depicting signs	8.6%	2.3%
Palm-ups	8.3%	1.5%
Numbers	3.9%	1.1%
Enactments	2.2%	0.6%
Fingerspellings	0.2%	0.4%
Unclear	3.2%	1.1%
Sum	100.0%	100.0%

Results for lecture 2

Table 18. Distribution of sign types for the IS 1 and NGT 1 interpreters' first relay - Lecture 2

Sign types	IS 1 interpreting <i>n</i> = 837	NGT 1 interpreting <i>n</i> = 903
Lexical signs	65.8%	82.6%
Pointing signs	16.9%	10.5%
Palm-ups	6.7%	1.2%
Depicting signs	4.7%	2.0%
Numbers	3.8%	1.9%
Enactments	1.8%	0.8%
Fingerspellings	0.2%	1.0%
Unclear	0.1%	0.0%
Sum	100.0%	100.0%

Table 19. Distribution of sign types for the NGT 2 and IS 2 interpreters' second relay - Lecture 2

Sign types	IS 2 interpreting <i>n</i> = 771	NGT 2 interpreting <i>n</i> = 945
Lexical signs	59.9%	80.9%
Pointing signs	21.0%	9.3%
Depicting signs	8.4%	2.4%
Palm-ups	7.0%	4.1%
Enactments	2.6%	2.2%
Numbers	0.9%	0.4%
Fingerspellings	0.1%	0.6%
Unclear	0.0%	0.0%
Sum	100.0%	100.0%

Qualitative observations

Although our study is quantitative rather than qualitative, when coding we observed a number of noteworthy elements that help to explain the rationale underlying the percentages. Looking beyond the sign type distribution provides a better understanding of how IS works and generates ideas for future research. In this section, we present qualitative observations based on both our expected and unexpected results.⁷⁰ Each point has the potential for in-depth stand-alone research.

Pointing signs in IS and NGT interpreting

As expected, pointing signs in IS interpreting are almost twice higher than in NGT interpreting. This may be due to the high occurrence of repetition (by two forms of pointing signs) in IS. Figure 19 illustrates a repetition of pointing sign in different forms; this rarely occurs in NGT.⁷¹

We also observed sequences of IS interpreting where pointing signs formed half of the total of the signing sequence, while this was identifiable in NGT interpreting (Figure 20).

^{70.} See section 4 "Research question and predictions".

^{71.} See the introduction chapter for the definition of "repetition" versus "reiteration".

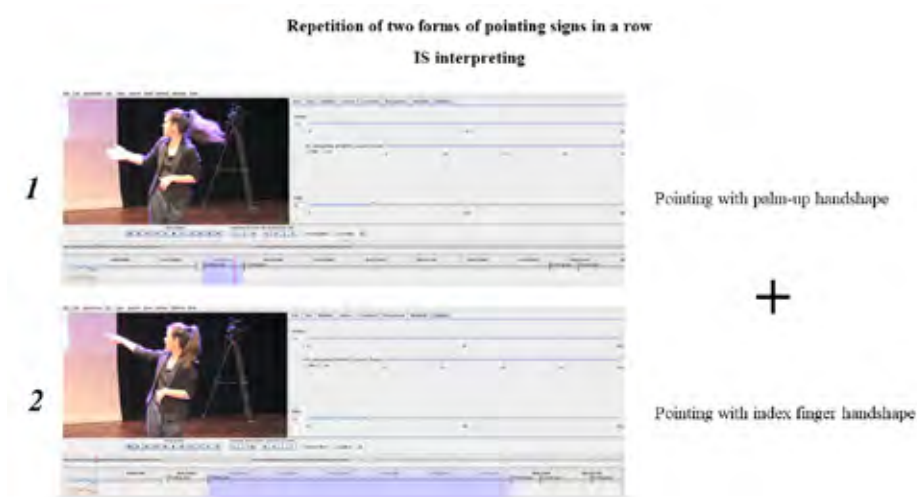


Figure 20. Example of a repetition of two forms of pointing signs in a row in IS interpreting



Figure 21. Example of an IS interpretation sequence with pointing signs highlighted by arrows

Comparing the use of numbers in IS and NGT interpreting

We observed that number sign types in IS are used somewhat differently than in NGT. We expected the same use for both teams of interpreters as numbers have a permanent meaning, most of all for quantity, however numbers were used more often in IS. Seleskovitch and Lederer (1997) explain that in interpreting, numbers do not need to be extracted from their meaning; they need to be “transcoded”: five = five.⁷² As an example from our dataset, Figure 21 illustrates our expectation, i.e., numbers would be interpreted similarly; the presenter speaks about *five* periods of time for the development of an animal species.

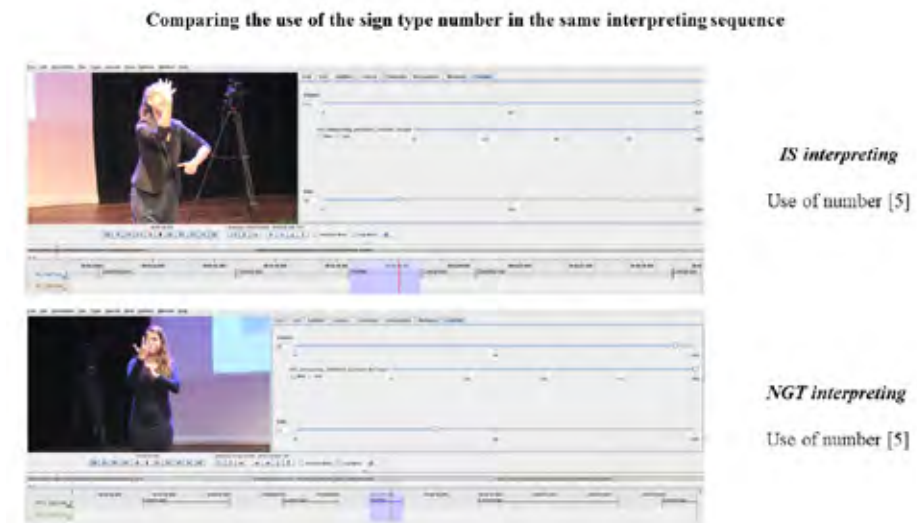


Figure 22. Example of literal interpretation of the number 5 in IS and NGT interpreting

However, we also observed different uses of numbers. For example, IS interpreters often use the number [1] to define specificity. Figure 22 illustrates this; the presenter discusses something universal to all human beings - the wish to communicate with the dead. The IS interpreter chooses to use number [1] to interpret this *one* universal thing, while the NGT interpreter did not use a number to interpret this part of the discourse.

Comparing the use of fingerspelling in IS and NGT interpreting

As expected, we observed that IS interpreters use fewer fingerspelled forms than their NGT counterparts. This is explained, partially, by the fact that IS

⁷². Transcoded is used as a loose translation of the French word “transcodés” (see Seleskovitch & Lederer, 1997, p. 7).

interpreters make more use of the local context by pointing to the entity (see McKee and Napier, 2002). Figure 23 illustrates an example of pointing instead of fingerspelling; while the NGT interpreter chose to fingerspell the name of the presenter, the IS interpreter chose to point towards him; note that the host speaker explicitly mentioned the name of the presenter.⁷³

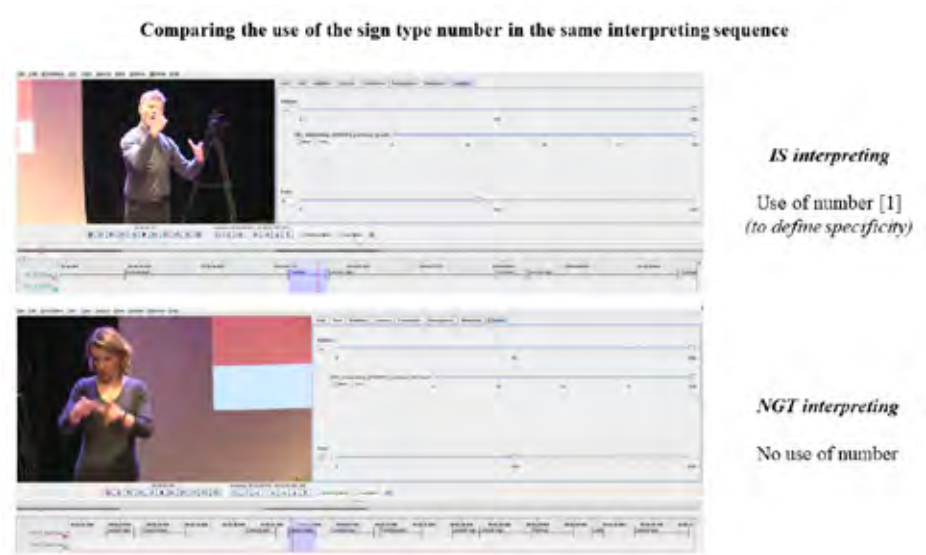


Figure 23. Example of the different use of the sign type 'number' in IS and NGT interpreting

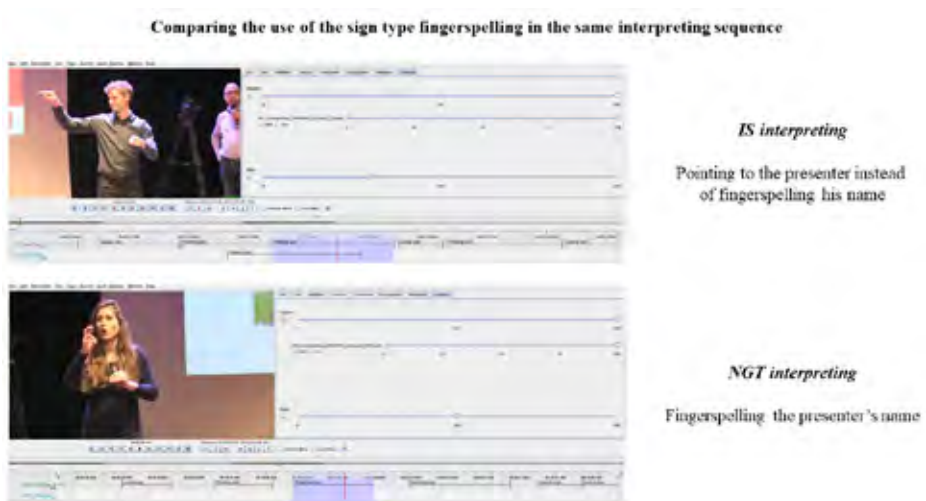


Figure 24. Comparing the use of fingerspelling in IS and NGT interpreting

⁷³. Note, the presenter, did not have a sign name.

Discussion

Our study is the first of its kind as it directly compares IS to a national sign language, in this case NGT. This sign type distribution can indirectly be compared to Whynot's (2016) results from an indirect comparison between expository IS and ASL, BSL, and Auslan. In addition, we mention two other studies which were unpublished by Whynot (2016)'s paper on sign type distributions; one for SSL and one for ISL. These extensive, yet indirect, comparisons give us insights into how IS behaves in comparison to other national sign languages (see Table 20). This broader comparison shows that IS used by interpreters does not always appear to behave differently than national sign languages. For instance, in some cases IS behaves like BSL in terms of the percentage of lexical signs (e.g. 60.3% for BSL versus 59.9% for IS) while in others IS is close to SSL in terms of percentage use of partly lexical pointings (e.g. 16.1% for SSL versus 18.6% for IS). Only in our direct comparison between IS and NGT interpreting is it clear that IS behaves differently than the national sign language - NGT.

Table 20. Comparison of sign type distributions among sign languages and IS; studies from 2003 to 2023)⁷⁴

Sign types	Whynot (2016)				Published after Whynot's study			Our study	
	Indirect comparison between IS and national SLs						Direct comparison		
	IS lectures (n = 7,033)	Auslan Corpus (n = 54,506)	ASL (n = 4,111)	BSL (n = 24,823)	SSL (n = 44,786)	ISL (n = 100)	IS interpreting (n = 3,211)	NGT interpreting (n = 3,894)	
Fully lexical sign (including numbers)	63.6%	64.8%	73.1%	60.3%	68.3%	87%	59.9%	80.2%	
Fully lexical fingerspelling ⁷⁵	1.74%	5.0%	6.4%	3.0%	4.0%	n/m	0.3%	1.1%	
Fully lexical name signs	1.74%	0.25%	2.3%	n/a	2.5%	n/m	n/a ⁷⁶	n/a	
Partly lexical pointing signs	14.5%	12.0%	13.8%	23.0%	16.1%	n/m	18.6%	11.2%	
Partly lexical depicting signs	10.2%	11.0%	4.2%	2.3%	2.8%	n/m	7.6%	2.4%	
Non-lexical gesture	9.0%	6.5%	0.2%	8.9%	3.4%	n/m	n/a ⁷⁷	n/a	

⁷⁴. IS lectures data from Whynot (2016); Auslan Corpus data from Johnston (2012); ASL data from Morford and MacFarlane (2003); BSL data from Fenlon, et al. (2014); SSL data from Börstell (2016); ISL data from Smith (2020).

⁷⁵. Other tables displaying the same results in Whynot's book refer to "fingerspelling" instead of "fully lexical fingerspelling". Therefore, we assume here that "fully lexical fingerspelling" refers to (regular) fingerspelling and not what is commonly called "lexicalized fingerspelling" in the literature; precise definitions are given in section 4.2.

⁷⁶. In our sign type nomenclature, name signs were part of the lexical sign type.

⁷⁷. In our study gestures were part of the lexical sign type; see section 5.2 "Sign types".

From both the previous non-direct comparisons and this current direct comparison, IS behaves similarly to the national sign languages in the sense that IS's main sign type is lexical signs (> 50%). The nuance can be found in our strict comparison which shows that the difference between IS and NGT lexical signs is more extensive than observed in indirect comparisons with other national sign languages. The occurrence of IS lexical signs in IS interpreting (59.9%) is 20% lower than NGT lexical signs (see Figure 24), yet this is still the most common type.

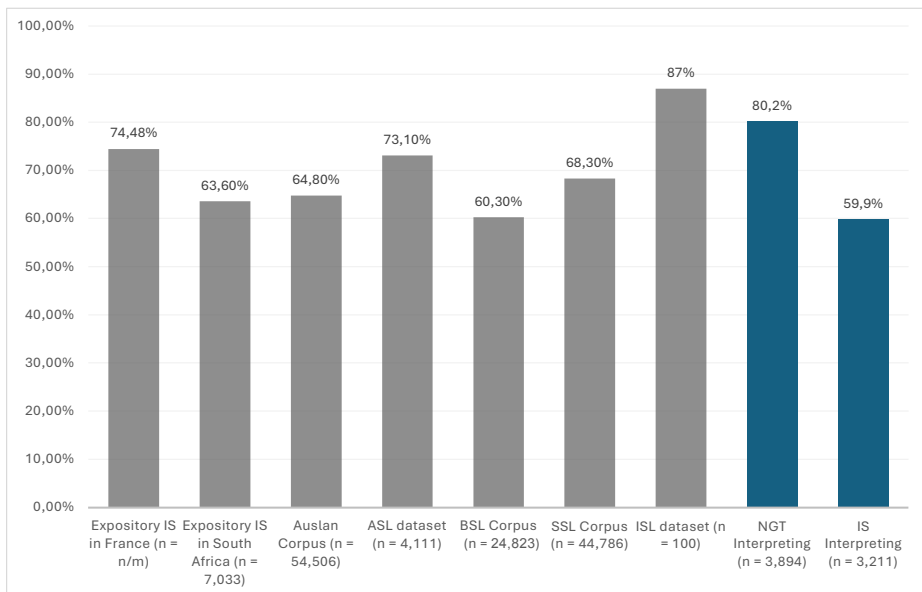


Figure 25. Percentage of lexical signs per sign language et IS from studies from 2001 to 2019⁷⁸

Focusing on our results, i.e., the direct comparison between IS and NGT interpreting, we highlight two main observations. On the one hand, we observed that the sign types with higher iconicity, i.e. pointing, depicting signs and enactments, were more used in IS interpreting than in NGT, in line with our expectations. On the other, the sign types with less iconicity, i.e. lexical and palm-up signs, were used less in IS interpreting than in NGT interpreting. Concerning the sign types closely tied to the language of the source text, we

⁷⁸. IS lectures in France data from Monteillard (2001), IS lectures in South Africa data from Whynot (2016), Auslan Corpus data from Johnston (2012); ASL data from Morford and MacFarlane (2003); BSL data from Fenlon et al. (2014); SSL data from Börstell et al. (2016); ISL data from Smith and Hofmann (2020).

observed, as expected, less use of fingerspelling and, interestingly, a greater use of numbers.

The qualitative results showed instances of the use of pointing. The examples align with McKee and Napier (2002) where they describe how IS interpreters tend to make extensive use of the real-life environment by pointing. In our dataset, IS interpreters directly point to the presenter while the NGT interpreter fingerspells the name; IS interpreters point to the slides many times in a row while the NGT interpreter only does this once. Moreover, we observed long-second sequences where IS interpreters used pointing signs once every other sign type while this was not the case for NGT.

Concerning the use of numbers, our method allowed us to determine the percentages of numbers while in previous studies numbers were coded under the lexical sign type. This is informative as the breakdown of the sign type number showed that IS interpreters use it as a strategy to convey meaning. In their aim to be extra clear, IS interpreters have hijacked the regular use of numbers to convey specificity.

Finally, the percentage for the unclear signs is twice as high for IS interpreting than for NGT interpreting. This may be because IS is more difficult to grasp due to its high flexibility and its lower conventionalization than other fully-fledged sign languages.

Conclusion

In this paper, we present the first direct comparison of the sign type distribution between IS and a national sign language, NGT. Specifically, we compared IS and NGT in the context of interpreting. In general, IS – as an umbrella term – has been observed to behave differently from national sign languages, yet no studies have strongly pinpointed this difference as to date, no direct comparison has been made between IS and national sign languages.

Our work fills this gap in two ways. *First*, IS interpreting is directly compared to another national sign language, here NGT, and this contrast sheds light on what IS is composed of. Until now, expository IS has only been compared indirectly with national sign language datasets (ASL, Auslan, and BSL). As a side effect of this comparative study, we also evaluated NGT interpreting sign

type distribution, which has never been studied. *Second*, our work provides IS interpreting sign type distributions as to date, IS sign type distributions have only been undertaken for expository IS (during lectures).

By allowing a direct comparison of the sign type distributions between interpreting into IS and into a national sign language, we confirm findings from previous qualitative studies on IS interpreting. For example, McKee and Napier (2002) show that IS interpreting relied more on iconic and local contextual knowledge i.e., greater use of depicting and pointing signs and enactments than NGT interpreting. Moreover, IS interpreting relies less on highly pre-existing linguistic knowledge such as fingerspelling and lexical signs compared to NGT interpreting. Yet, lexical signs remain the main sign type in both IS and NGT; IS interpreters used 59.9% of lexical signs while NGT interpreters used 80.2%.

The lower occurrence of lexical signs in IS in comparison to NGT interpreting suggests an obvious effort by the IS interpreter – either forced effort because of the lack of lexical resources or desired effort because of the aim to be widely understood – to reduce the use of lexical sign. Our findings align with De Wit et al. (2021) who observed the preparation phase before the interpreting assignment. In this phase, the IS interpreters tried to find alternatives to lexical signs while the NGT interpreters did not. In line with the way interpreters prepare their assignments, our study affirms that IS interpreting behaves differently to NGT interpreting in its use of lexical signs, a difference that was not observed when comparing IS to national sign languages indirectly, via unrelated datasets. Yet, IS interpreters using fewer lexical signs than NGT interpreters aligns with the obvious effort to reduce lexical signs as described in qualitative studies (e.g. McKee & Napier, 2002).

We discuss two possibilities for researchers to extend our research, using the available videos and annotated dataset. These concern the main sign type, i.e. the lexical signs, which is strongly at play when it comes to defining IS as a language or not. The first is to study the relationship between lexical signs and iconicity, the second is to focus on the origins of the lexical signs.

To explore the first possibility, it can be assumed that many of the lexical signs used in IS interpreting are iconic – in the sense that their form resembles the referent – yet iconicity is not universal as noted by Occhino et al. (2017) who states that iconicity does not mean transparency. They showed that

signers would rate signs from their own sign language with higher scores in terms of iconicity than others. Thus, what is considered iconic depends on the signer's first language and on experience. If iconicity does play a role in the comprehension of these lexical signs, we do not yet know to what extent. Although comprehension of the IS output is out of the scope of this present study and, in general, the dissertation, it is interesting to consider the extent of the role played by iconicity when IS interpreters select specific lexical signs during their interpreting.

Second, beyond IS users language ideologies (e.g. "IS is (or should be) 'more visual/iconic' " (Kusters, 2020, p. 53), "the avoidance of ASL" (Kusters, 2020, p. 54)) researchers can investigate the origins of the lexical signs. Whynot (2016) provided language origins of IS lexical signs used in her study on expository IS, based on her own language repertoire. Further research can focus on the extent of overlap between the origins of the lexical signs with the audience's languages (see Chapter 5 of this thesis). This would also yield quantitative information on whether lexical signs from one sign language (e.g. ASL) are over-represented in IS communication.

The IS lexicon has been defined as "limited" and "impoverished" by others, yet in our dataset, IS lexical signs formed the bulk of the signs. In the next and final study of this dissertation, we zoom in on lexical signs, the main sign type in IS and NGT interpreting, questioning the way these (59.9% of) IS lexical signs were used in IS interpretation. We explore these terms and operationalize "limited" and "impoverished" as a lack of diversity and the over-presence of high-frequency lexical signs for IS interpreting in comparison to NGT interpreting. As the lack of a defined lexicon is one the main obstacles to the recognition of IS as a language among linguists, providing more detailed information on the use of lexical sign in IS, based on a strict comparison to NGT, will provide more insights into how IS behaves as a language.

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Chapter 4

Comparing the lexical diversity and frequency in IS and NGT interpreting

"L'herbe n'est pas plus verte ailleurs, elle est plus verte là où tu l'arroses"

- French proverb

Abstract

The lack of a defined core lexicon in international sign (IS) presents challenges for both practitioners and researchers, fueling debates about its linguistic status. This study examines the lexical diversity and frequency in IS interpreting compared to *Nederlandse Gebarentaal* (NGT) interpreting, addressing claims that the IS lexicon is 'impoverished' and 'limited'. Through quantitative analysis, we evaluate whether these terms remain applicable and explore the implications of lexical diversity and frequency for interpreting practices.

Our results show that IS lexical diversity is slightly lower than that of NGT, with IS interpreters reiterating the same signs more often. However, the gap is minimal, challenging the perception of IS as radically distinct or deficient compared to national sign languages. Additionally, we analyze the frequency of lexical signs, providing comprehensive lists of the most frequently used signs in IS interpreting. These findings add to previous studies on IS lectures, offering a broader perspective on IS lexical patterns across contexts.

This research not only informs discussions on IS's status as a language but also provides practical insights for IS users. The data could guide curriculum development for IS learners and foster a deeper understanding of IS's unique characteristics, contributing to its recognition and effective use in multilingual settings.

Introduction

The main challenge with international sign (IS) interpreting for both linguists and practitioners is the lack of a defined (core) lexicon (McKee & Napier, 2002; Moody, 2002). The choice and use of IS lexical signs has always been an issue in international signing communication,⁷⁹ whether it is to agree on a lexical sign via repair sequences (see Byun et al., 2018) or to disqualify a lexical sign (see Kusters (2020) for ASL lexical signs critics). This stresses the need for more empirical studies on the lexical signs used in IS as an IS core lexicon has not yet been formally defined as a lexical database, as is the case for NGT, for instance (Crasborn et al., 2016).

For interpreting, while several qualitative studies describe alternatives to the use of lexical signs in IS (see McKee & Napier, 2002; Moody, 2002; Rosenstock, 2008), several quantitative studies, including our study “Comparing the sign type distribution of IS and NGT interpreting” (see Chapter 3), have found that lexical signs form the bulk of the signing content (Monteillard, 2001; Whynot, 2016). For instance, we found that lexical signs represent 59.9% of the IS interpreting signing content. This contrasts with claims that the IS (core) lexicon is ‘limited’ (McKee & Napier, 2002, p. 46; Rosenstock, 2007, p. 100) and ‘impoverished’ (Allsop et al., 1995, p. 187). In addition, IS interpreting has been described as “[...] maximizing use of grammatical structures and non-lexical resources” (McKee & Napier, 2002, p. 51). Therefore, in this current chapter we explore how interpreting approaches these seemingly contrasting results: the majority of lexical signs in the sign type distribution on the one hand and the supposed maximization of grammatical structures and non-lexical resources on the other. By investigating what is covered by the 59.9% of lexical signs, we expect to gain a better understanding of the nature of the linguistic resources.

First, we expect that the terms ‘impoverished’ and ‘limited’ as denoted in the literature can be operationalized by the lack of diversity and overuse of high-frequency lexical signs for IS interpreting in comparison to NGT interpreting. In an extensive literature review comparing IS and English as a *lingua franca*, Bierbaumer (2020) highlighted the issue about the continued use of the term “impoverished” to describe the use of lexical signs in IS.

⁷⁹. International signing communication includes IS occurring in different contexts: first-time encounter, lectures and interpretation – see the Introduction chapter.

“Although IS lexicon has been described as “severely impoverished” (Allsop, Woll & Brauti 1995: 187), given the rather limited range of conventional lexical signs, and some have even called IS as a form of foreigner talk (Adam, 2012; Quinto-Pozos, 2007), it seems that these derogatory terms are most probably the result of the unsatisfying quest to find a decent category for IS, rather than the outcome of a reliable comparison between IS and some sign language’s prescribed norms.” (Bierbaumer, 2020, p. 43)

Thus, our aim is not to define an IS core lexicon nor to standardize IS; our aim is to bring recent data into the discussion on the use of the terms ‘impoverished’ and ‘limited’ and observe whether these terms are still relevant when it comes to IS lexicon. In this paper, we explore the quality of the lexical signs used in IS interpreting from a diversity and frequency perspective and we directly compare it with the quality of the lexical signs in NGT interpreting.

This chapter is structured as follows: we start with a description of the use of lexical signs in IS in relation to iconicity, then we define the terms lexical diversity and lexical frequency, and finally we present the results for lexical diversity and frequency in IS and NGT interpreting. After discussing the results we conclude and provide recommendations for further research.

Lexical signs used in IS

It is worth noting that the first resources created to acquire IS were lexical by nature. The Gestuno lexicon published in 1975 (British Deaf Association, 1975) and its precursors *the little blue booklet* (1959) and *the little pink booklet* (1971) were simple lists of vocabularies. These were distributed at WFD conferences (Magarotto, Cesare & Vukotic, 1959; World Federation of the Deaf, 1971). Later on, WFD conference participants were given CDs and DVDs with recorded lexical signs. The more recent book “Passeport” presents a list of 150 LSF lexical signs with their IS translation (*Passeport*, 2021). However, the Gestuno lexicon is the best known of these and is commonly the point of reference in articles on the lexical signs used in IS (see Moody, 2002; Nilsson, 2020; Whynot, 2016).

Gestuno is a list of 1470 lexical signs selected from diverse national sign languages by the WFD working group for the unification of signs. The aim of

the working group was to standardize international communication within WFD and the CISS, two major deaf organizations (Madsen, 1976). The group selected European (Italy, England and Russia) and American (US) lexical signs that they found “the best from various nations based on clarity and ease of use.” (Madsen, 1976, p. 12). It was assumed that deaf people and sign language interpreters would use the Gestuno list at following WFD events. However, this did not happen: deaf people complained that the selected signs were not iconic enough, and interpreters felt limited by this list of supposedly international signs when they would have felt more flexible maximizing other linguistic resources like classifiers, directional verbs, et cetera (Moody, 2002). Yet, Whynot (2016) identified Gestuno signs in her 2011 IS lectures recorded dataset where she established a list of 200 highly frequent lexical signs used in her expository IS dataset. Her list has a *descriptive* dimension as she mentioned the origin of each lexical sign based on her own language repertoire and knowledge (ASL, Auslan, BSL and Gestuno).

When it was introduced, the Gestuno list had a *prescriptive* dimension. The WFD committee compiled Gestuno on the basis of the existing lexicon of a handful of national sign languages (see Monteillard, 2001). After trialing the Gestuno list at the WFD “Conference on the Family” in 1977 in Copenhagen, interpreters decided against its use (Moody, 2002). However, in addition, the status of international sign as a full-fledged language has been under debate principally due to its lexicon, as this varies depending on the communication context (Hansen, 2016). For example, high numbers of national language lexical signs were found by Woll (1990) when IS occurs in the UK, Monteillard (2001) in France, Sheneman and Collins (2015) in the US and Nana Gassa Gonga et al. (2022)⁸⁰ in the Netherlands.

Thus, to compensate for this lexical instability, IS is said to be characterized by more iconic elements, in the sense that the manual sign resembles the referent, i.e., iconic and/or metaphoric motivation (Brennan, 1992; Taub, 2001). However, this iconic element behind lexical signs can be hidden. With conventional items, we know that iconicity is a strong factor in shaping lexical signs (Perniss & Vigliocco, 2014; Taub, 2001) but over time, this iconicity can become dormant (Johnston & Ferrara, 2012; Sandler & Lillo-Martin, 2006). Thus this dormant iconicity has to be reactivated or stressed as explained by the IS interpreter Bill Moody:

⁸⁰. Presented in the Chapter 5.

"You can start by exaggerating its [the lexical sign's] iconic roots, if it has any, and you might want to "unmark" the handshape to make it less specifically a sign from your sign language, then hope that it is understood in the context." (Moody, 2002, p. 35)

In addition to this reactivation of iconic roots, McKee and Napier (2002) documented IS interpreters in 1995, making particular use of space to locate referents (including lexical signs) and/or increasing the size of the signing space. This confirms the use of lexical signs and shows that they are used with specific strategies.⁸¹ However, as there has been no direct comparison with another national sign language – even if McKee and Napier (2002) touch on this comparison – we do not yet know to what extent IS differs from national sign language construction and, referring back to the term 'impoverished', what it exactly covers.

This notion of being 'impoverished' – based on data from deaf signers collected between 1985 and 1994 – may result from the lack of diversity of the lexical signs in any given recording of IS. This also aligns with recent data. For instance, Rosenstock (2008) analyzed IS used by interpreters in 2002 and mentioned that they could use one specific lexical sign for many less-specific lexical words. This is the case, for example, with the sign group used in her dataset as a translation for the words "business" and "organization".⁸² This means that IS shows less diversity in its lexical signs. However, since then, there are valid reasons for assuming that IS used by interpreters has evolved due to the increased demand for IS interpreting, which would lead to greater stabilization (Wit et al., 2023). In addition, in our study (Chapter 3) we demonstrate a high percentage (59.9%) of lexical signs in IS interpreting.

Beyond Gestuno and Whynot's 200 frequent IS signs list, IS lexical signs can, in theory, be selected from all national sign languages which allows for endless possibilities. It is known that "it helps to know two or three different sign languages: the international signer can then just choose the sign that seems the most transparent or intelligible from one language or another." (Moody, 2002, p. 34), and that almost 60% of the IS interpreters interviewed by De Wit know two or more sign languages (Wit et al., 2021a). Based on this,

⁸¹. For more instances, see Chapter 5, "Interference: a case study of lexical borrowings in international sign interpreting".

⁸². These two lexical signs are probably distinguished by the mouthing. For work on mouthing in IS communication, refer to Bierbaumer (forthcoming).

we could theoretically argue that IS has many thousands of lexical signs at its disposition to create meaning, while not even mentioning those signs coined created for the unique purpose of the situation (see Woll, 1990).⁸³ In practice, most IS interpreters only know one or two sign languages (see O’Callaghan, 2023 for instance). Yet, the interpreters’ sign language rarely matches those known by the multilingual audience (e.g., see the dataset presented in Chapter 3). In our case study, one IS interpreter had one national sign language, while the other had two. However, we did not analyze the extent to which these IS interpreters relied on all the specificities of their national sign languages, namely the lexicon, to create meaning.⁸⁴

Concerning NGT, the story is different. NGT has had a lengthy history of research and development (see Schermer, 1983; Schermer & Harder, 1986). Research shows that NGT’s origins in (at least) 1790 are related to the founding of the first deaf school. Hence, NGT has many more conventional items in comparison to IS. The website *Nederlands Gebarencentrum*, which hosts an online NGT dictionary, documents more than 16,000 lexical signs for NGT.⁸⁵ We know that NGT interpreters refer to this online dictionary during their interpreting preparation phase, as observed by Wit et al. (2021). However, IS interpreters preparing for the same assignment did not explicitly refer to Gestuno or Whynot’s (2016) list, nor to any other IS lexical resources. Nevertheless, drawing upon the sign language repertoire of the interpreters, we show that one IS interpreter relied on ASL and LSF lexicons, while the other relied on the LSE lexicon (see part 5.1 Dataset).

In summary, IS has been termed “impoverished” regarding its lexicon yet no study has presented a direct comparison with another national sign language lexicon to determine how “impoverished” it is. In this chapter, we operationalize the term “impoverished” and compare the lexical diversity and

^{83.} These signs are referred to as “nonce signs” in Woll (1990). Nowadays, nonce signs refer to signs that carry no meaning and not signs created for the unique purpose of the situation. Our understanding of Woll (1990) is that her use of the term “nonce sign” would refer to signs created for the unique purpose of the situation. These signs created for the unique purpose of the situation should not be confused with neologisms. While the first are created on the spot for a specific situation, the latter are created with the aim to last over time and become part of the core lexicon of the language.

^{84.} This study does not investigate this aspect in depth, but it touches on this in part 6.2 “Lexical diversity: qualitative observations. Example 1- Using lexical signs from different sign languages in IS interpreting”.

^{85.} <https://ow.gebarencentrum.nl/> visited 08 January 2024).

lexical frequency between IS and NGT as used by interpreters. In the following sections, we further explore these concepts.

Lexical diversity, lexical frequency – note on terminology

Lexical diversity

The literature on *lexical diversity* reveals an ongoing discussion of concepts and terminology; the definition of the concept of lexical diversity is still under refinement, as illustrated by Jarvis (2013). The field of lexical diversity is multifaceted as a result of the changing definitions of the term “lexical diversity” over time. One of the first definitions of “lexical diversity” was published in 1938 by Carroll as “the relative amount of repetitiveness or the relative variety in vocabulary” (Carroll, 1938 p. 379).

At first this seems a clear definition, but over time, researchers have tried to refine and/or explicate it using terms like “lexical richness”, “lexical variety” or “lexical variation”, “vocabulary size” and “vocabulary depth” (see Jarvis & Daller, 2013).⁸⁶ Some researchers subscribe to the concept of “lexical diversity” coined by Carroll (1938), while others use the same term but with a different understanding than Carroll’s original 1938 definition.

Instead of drawing on Carroll’s wording of the “amount of repetitiveness” (i.e. “repetition”), we introduce the term “reiteration”, as repetition and reiteration have slightly different meanings in the field of sign language interpretation research. Rosenstock defines repetition to mean “ [...] the repetition of signs [concept] in more than one form” (Rosenstock, 2008, p. 144), while reiteration is defined as “[...] signs that are repeated in a text exactly the same way as initially stated” (Lawrence, 1994, p. 209). Thus, reiteration is about the phonological form, repetition is about the semantic concept irrespective of the form with which it is expressed.

^{86.} In spoken language linguistics, “lexical variation” refers to the range of vocabulary of a (spoken) language (Vidaković & Barker, 2009, p. 143). However, “lexical variation” has a different meaning in the field of sign language linguistics. Sign language linguists usually refer to “lexical variation” as the different forms (namely variation) in which a sign can be produced for the same concept by changing one or more parameters of the signs (see Lucas et al., 2003 for lexical variation in ASL; Lutzenberger, 2022 for lexical variation in Kata Kolok; Stamp et al., 2014 for BSL). Therefore, to avoid confusion we decided to not use the term lexical variation; instead we use the term lexical diversity to refer to the range of lexical signs.

Figure 25 shows a repetition example with the concept “same”. First, the interpreter signs the concept “same” with the lexical sign same which has the handshape flat (coded as same-4 in ELAN). The interpreter then repeats the concept of “same” using another lexical sign same, one with a different handshape i.e. index handshape (coded as same-3 in ELAN).⁸⁷

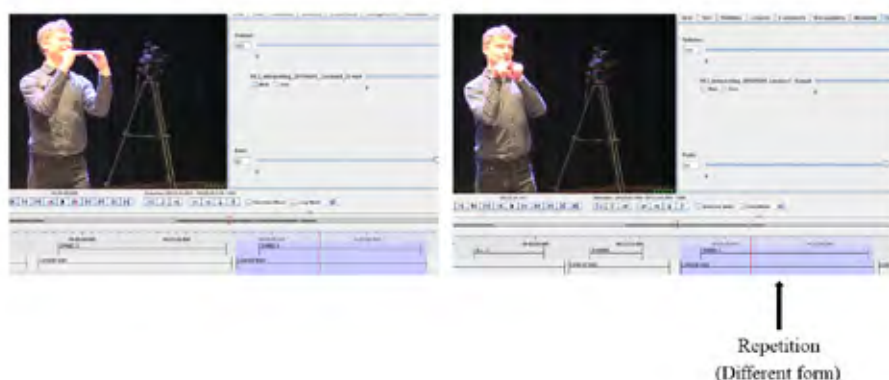


Figure 26. Example of a repetition in IS interpreting with the two lexical signs SAME

Then, Figure 26 gives an example of reiteration with the lexical sign impact. To interpret the concept “impact”, the interpreter uses the lexical sign impact once and immediately reiterates the exact same form of this lexical sign. He uses the same lexical sign impact twice in a row; these are coded similarly as impact in ELAN.



Figure 27. Example of a reiteration in IS interpreting with the lexical sign IMPACT used twice in a row

⁸⁷. Among other different parameters.

To ensure consistency with previous chapters of this dissertation and to be in line with sign language interpreting researchers, we base our definition of lexical diversity on the concept of reiteration. Therefore, by lexical diversity, we mean the amount of *reiteration* of lexical signs in the interpreting output, in relation to the total number of lexical signs used.

Given the debate on how to compute lexical diversity, in this study, we decided to compute lexical diversity using the most common method: the so-called TTR, i.e. the type-token ratio (see Lieven, 1978, Bates, Bretherton & Snyder 1988 cited in (Johansson, 2008)). The types are divided by the tokens to obtain a ratio between 0 and 1. The type is the first occurrence of (the form of) the lexical sign and the token is any occurrence of this lexical sign. For instance, in the utterance below, we have the sequence with the lexical signs: impossible – move – move – impossible – block-2 – puzzled-2 (see Figure 27).

The utterance shown in Figure 27 counts for 4 types, i.e. impossible, move, blocked-2 and puzzled-2; these types correspond to the first occurrence of these lexical signs. Then, 6 tokens: impossible, move, move, impossible, blocked-2 and puzzled-2 correspond to each occurrence of these lexical signs. Therefore, to measure the lexical diversity of this utterance, using the TTR formula, i.e. 'type divided by token' we compute 4 divided by 6 = 0.66. A higher ratio i.e., closer to 1, reflects a greater diversity of lexical signs.



Figure 28. Example of TTR calculation

In our research, based on our knowledge of the IS and NGT lexicons, we expect to observe more diversity, i.e. less reiteration in NGT than in IS; and we expect IS to be less diverse, with more use of reiteration. Consequently, the IS interpreting type-token ratio should be closer to 0 and that of NGT closer to 1.

Lexical frequency

While lexical diversity refers to the diversity of a particular language, *lexical frequency* is one of the main tools used in language teaching to help second language learners acquire this lexical diversity (Kidd et al., 2010; Nation, 2001). Lexical frequency or frequency studies in general, i.e. how many times a (lexical) word/sign occurs in a dataset and, to some extent, a language, is of great interests for linguistics and applied linguistics (Ellis, 2002).

In general linguistics, frequency studies have shown that languages tend to follow Zipf's law (Zipf, 1949): the more frequent a word, the lower its rank in a frequency distribution and, the more frequent a word, the more reduced it becomes over time (see Diessel, 2007). This pattern is not modality-specific, it is part of a universal feature of language and can also be observed in signed languages (e.g. Börstell et al. (2016) for SSL).

Concerning applied linguistics, frequency can inform how interlocutors comprehend and produce words/signs. The more frequent a word sign, the easier it is to comprehend and produce (Forster & Chambers, 1973 for production in English; see Marks et al., 1974 for comprehension in English; see Byun et al., (2022) for production in international signing communication).

We expect that results from frequency studies can be incorporated into the design curricula for second language learners. Currently, there is no academic language curriculum for IS learners and IS interpreters as there is for NGT learners/interpreters, (Wit, 2023). In fact, to date, only one IS frequency study has been undertaken (Whynot, 2016).⁸⁸ One of the main reasons for this lack of academic training may be that IS is commonly a skill extra to existing national sign language skills, and because these languages vary from signer to signer, it is even more difficult to design courses for this.

⁸⁸. Even though frequency studies based on the NGT Corpus have not yet been undertaken, NGT training courses have been academically developed, especially at Utrecht University; <https://www.hu.nl/voltijd-opleidingen/leraar-nederlandse-gebarentaal-tolk-ngt> (visited May 22, 2024). Regarding IS interpreting training, the EUMASLI program offers a module on IS interpreting (see <https://www.eumasli.eu/>, visited May 22, 2024).

In addition, IS is difficult to grasp. IS is highly dependent on the context and its form varies more with the situation than in regular sign language (Hansen, 2016). This may explain the lack of IS machine-readable corpora; what does exist is a variety of datasets of different instances of IS. For instance, Kusters (2020) and Woll (1990) based their studies on IS in the context of interaction (known as cross-signing), and Rosenstock (2008) and Stone and Russell (2016) based their studies on IS in the context of interpreting. However, their datasets are not available. Our IS interpreting dataset is the first to be made accessible to other researchers (see methods section).

More studies have been undertaken on the frequency of national signed languages – in comparison to IS – using machine-readable corpora, for example, those based on the Wellington Corpus of New Zealand Sign Language (McKee & Kennedy, 2006), the Auslan Corpus (Johnston, 2012), the BSL Corpus (Fenlon et al., 2014), the SSL Corpus (Börstell et al., 2016) and the Sign Of Ireland Corpus (Smith & Hofmann, 2020).⁸⁹ In general, these studies can be used to investigate the most frequent signs in their respective sign language, including lexical and non-lexical signs (see Börstell et al., 2016 for SSL; Fenlon et al., 2014 for BSL; D. McKee & Kennedy, 2006 for NZS;⁹⁰ Smith & Hofmann, 2020 for ISL). Only Johnston (2012) for Auslan presents frequency results with a focus on lexical signs. Similarly, for expository IS, Whynot (2016) proposes a frequency study based on lexical signs.⁹¹ Following the scope of our research, namely investigating the reasoning underlying the high percentage of 59.9% of lexical signs, we align with Johnston (2012) and Whynot (2016) and propose a frequency study targeting lexical signs.

Research questions

The aims of this study are twofold. First, we aim to bring original results on IS interpreting concerning its use of lexical signs, both in terms of diversity and frequency. IS is claimed to have a limited and impoverished use of (core) lexicon but *how* limited and impoverished is it exactly, and in comparison to what point of reference? If we interpret the terms ‘limited’ and ‘impoverished’

⁸⁹. As of note, frequency study has been undertaken for ASL based on frequency ratings in a lexical database, not on a machine-readable corpus (see Caselli et al., 2017).

⁹⁰. The NZSL study presents a list with lexical signs and index pointing signs, not only a lexicon.

⁹¹. These two studies are presented in more details in Chapter 3 of this dissertation: “Comparing the sign type distributions of IS and NGT interpreting”.

as having a small pool of repeatedly used lexical items, we want to undertake a lexical diversity study and compare it to a point of reference like a national sign language which is not under debate concerning its status as a language. In this study, we compare IS to NGT interpreting; our first research question concerns the lexical diversity of IS interpreting:

- What is the *lexical diversity* in IS versus NGT interpreting in terms of TTR? In other words, how many lexical signs are reiterated and how many are used only once?

In our previous study (see chapter 3), we report that the two IS interpreters used a smaller pool of lexical signs in comparison to the two NGT interpreters. In addition, according to the literature and the relatively young and unstable status of IS in comparison to NGT, we expect less diversity of lexical signs in IS than in NGT (Hansen, 2016; McKee & Napier, 2002; Moody, 2002).

After contributing quantitative results on IS lexical diversity in the context of interpreting, we aim to extend our understanding of the use of lexical signs in IS by researching the lexical signs most used within this pool of lexical items (lexical frequency). Following up on Whynot's (2016) work on lexical frequency based on IS in the context of conference presentations, we aim to complement these results with a lexical frequency study on IS in the context of interpreting in the comparison with NGT interpreting as the point of reference, still. Therefore, for our second research question, we pose:

- What is the *lexical frequency* in IS versus NGT interpreting? In other words, what are the most frequent lexical signs?

In order to compare IS and NGT lexical diversity and frequency, we organized a conference to collect authentic conference data while facilitating informed consent and controlling the number of audience languages involved. The dataset is described in the next section.

Method

Dataset

To compare lexical diversity and lexical frequency in IS and NGT interpreting, we collected data in May 2019 as described in detail in Chapter 3; in this current

study we use a subset of that data.⁹² Our dataset is a staged lecture given at Radboud University entitled “The biodiversity crisis and the global conservation assessments” given in English to a lay audience by an Associate Professor from Radboud University. This lecture was simultaneously interpreted by a team of two IS interpreters (IS1 and IS2) and two NGT interpreters (NGT1 and NGT2) working in parallel. Figure 12 in Chapter 3 shows the event setting.⁹³ The NGT 1 interpreter worked in parallel with the IS 1 interpreter to interpret the same segment of the lecture; and, the NGT 2 interpreter worked in parallel with the IS 2 interpreter.

The first part of the lecture on the mass extinction of animals was interpreted by the relay of interpreters NGT 2/IS 2; hence called relay “Mass extinction”. The second part of the lecture on global climate change was interpreted by the relay of interpreters NGT 1/IS 1; hence called relay “Climate change”. Table 21 presents the relay setting associated with the metadata for each interpreter. All interpreters gave written consent to participate in this study.⁹⁴

Table 21. Metadata for the NGT and IS interpreters by relay

	Relay “Climate Change”		Relay “Mass extinction”	
	NGT 2	IS 2	NGT 1	IS 1
Professional experience in interpreting (in years)	2.5	7	7	6
Native spoken languages	Dutch Hungarian	English	Dutch	Spanish Basque
Native sign language	n/a	ASL	n/a	n/a
Non-native sign languages and IS	NGT	LSF IS	NGT	LSE IS

This event was organized for the specific purpose of our research with a pre-invited audience; i.e., a closed event. Ten deaf Dutch participants were part of the NGT audience with the IS audience being a mix of participants from China as shown in Table 22). All participants gave written consent in their native language; this was also explained in their native sign language by a deaf

^{92.} Other studies have been undertaken based on this dataset, e.g. see Wit et al. (2022) who focused on the preparation phase of the interpreting assignment and see chapter 3 of this thesis “Comparing the sign type distribution of IS and NGT interpreting I.”

^{93.} This code for the interpreters corresponds to the same code used in Wit et al. (2021) and in Chapter 3 “Comparing the sign type distribution of IS and NGT interpreting”. Therefore, the reader can easily make connections between de Wit and our findings.

^{94.} See Appendix 3 for the consent form in English.

coordinator. This deaf coordinator recruited the local deaf participants in their country and then accompanied the group of deaf people along the recordings of the data.

Table 22. Metadata of the IS audience

Country of residence	National sign language	Participants
China	CSL (Chinese Sign Language)	<i>n</i> =5
Belgium-Flanders	VGT (<i>Vlaams Gebarentaal</i>)	<i>n</i> =3
Belgium-Wallonia	LSFB (<i>Langue des Signes Francophone de Belgique</i>)	<i>n</i> =5
The Netherlands	NGT (<i>Nederlands Gebarentaal</i>)	<i>n</i> =5

Coding the lemma ID glosses with ELAN

We used the annotation software ELAN (Crasborn & Sloetjes, 2008) to code our dataset. We coded the data based on the coding of our study presented in Chapter 3.⁹⁵ Previously, we added ID glosses (labels) depending on the different sign types: lexical sign, depicting sign, pointing sign, numbers, palm-up, fingerspelling and enactment. In this case, we examined the exact same dataset, focusing on the lexical sign labels to which we added a new tier to code a translation of this lexical sign. This translation was consistent over the dataset and is referred to as the lemma ID gloss. Figure 28 shows a screenshot of the ELAN file where this study's lemma ID gloss are coded on top of the coding of the Chapter 3 lexical sign ID glosses.

Please note: some lexical signs coding from the Chapter 3 study are missing for the NGT 2 interpreter. Hence, the NGT annotator could not rely on this already annotated part of sign types. Therefore, the annotator analyzed the dataset to determine whether or not a sign was lexicalized following the sign type definitions described in Chapter 3. If the sign was lexicalized, then, the annotator added the lemma ID gloss of this lexical sign on a new tier.

^{95.} In Chapter 3, we detail a miscommunication among annotators that led to partially missing annotation. This does not hinder the coding of the present study.



Figure 29. Screenshot of an annotated ELAN file for IS interpreting showing sign types ID glosses and lemma ID glosses for lexical signs

A lemma or a headword is used to represent a set of words/signs (lexemes) connected to each other by their form or meaning (Fenlon et al., 2015; Hochgesang et al., 2018). Fenlon (2015) illustrates this lemmatization phenomenon by an example taken from spoken English where the word ‘walk’ is the lemma and its lexemes are ‘walk’, ‘walks’, ‘walking’, etc. By following this lemmatization process (see Gries & Berez, 2017), we coded the lexical signs according to their *form* rather than their meaning.

This means that if two lexical signs have different forms but the same or a similar meaning, we annotated these lexical signs with the same lemma/headword adding a hyphen and a number suffix to show that the forms differ from each other. For instance, Figure 29 shows that the IS interpreter signs what -1 with one hand and the index-finger handshake and what-2 with two hands and the palm-up handshake.

Figure 30 shows another example with three different forms for the lexical sign more: more-1 where the dominant (right) hand is flat, more-2 where both hands are bent, and more-3 where the dominant hand is bent and the non-dominant hand is straight.

Lexical sign	Lemma ID gloss
	WHAT-1
	WHAT-2

Figure 30. Example of coding for lemma ID glosses with number suffix; lexical sign WHAT

Lexical sign	Lemma ID gloss
	MORE-1
	MORE-2
	MORE-3

Figure 31. Example of coding for lemma ID glosses with number suffix; lexical sign MORE

Furthermore, if the form of a lexical sign appears many times but with a different meaning each time, we annotated these lexical signs with the same lemma/headword as the form remains the same. In other words, morphological variants of lexical signs such as spatial inflections were all counted as instances of the same lemma. For instance, in our dataset, the form of the lexical sign more is used with the meaning “more” and with the meaning “north”; still the form remains the same. This is why, following our guidelines (see Appendix 4), we coded this lemma ID gloss as more, irrespectively of its meaning in the context (see Figure 31).

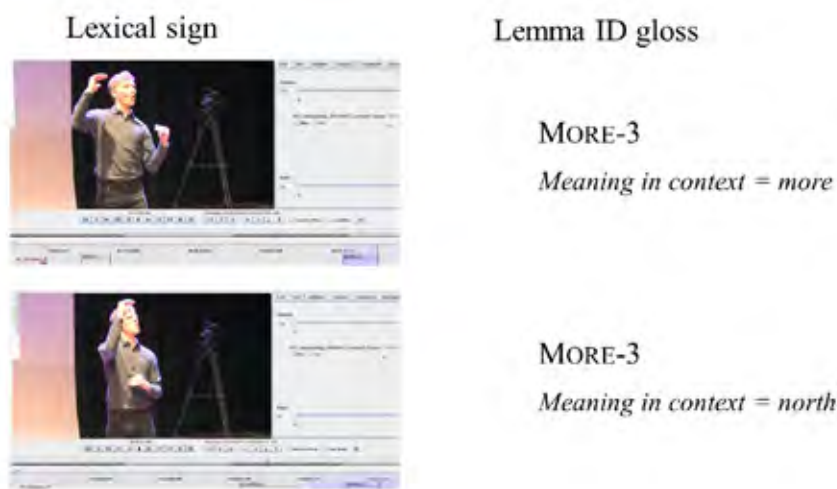


Figure 32. Example of coding for lemma ID glosses with the lexical sign MORE having the same form, yet a different meaning

The coding task in this study was divided among the same annotators as those who worked on the Chapter 3 study, so they were familiar with the dataset. One deaf annotator, TU, coded the NGT part using Dutch lemmas and one hearing annotator, AN, coded the IS part using English lemmas. We coded 10 minutes of data per interpreter; see Table 23.

Table 23. Overview of collected and annotated data for lecture 1

	Interpreters	Collected dataMinutes (rounded)	Annotated dataMinutes (rounded)	Annotator of the lemma ID glosses	Language of the lemma ID glosses
Relay "Mass extinction"	NGT 2	29 min	10 min	Deaf NGT Native	Dutch
	IS 2	29 min	10 min	Hearing Skilled in IS	English
Relay "Climate change"	NGT 1	29 min	10 min	Deaf NGT Native	Dutch
	IS 1	29 min	10 min	Hearing, Skilled in IS	English

Each annotator received the annotated ELAN file of the lecture "The biodiversity crisis and the global conservation assessments" used in the Chapter 3 study. The annotators were instructed to refer to each annotation on the existing tier "sign type" and to add their own lemma ID glosses on a new tier "ID-Gloss". The annotators were asked to follow the form of the lexical sign, to pay attention to the number suffixation system (e.g. more-1, more-2, etc.), and to be consistent throughout the process. In addition, the annotators were asked to code the lemma ID glosses with an exact start and end point, following the annotation guidelines of the Corpus NGT (Crasborn et al., 2020). This coding part was undertaken by the NGT annotator, TU, for both NGT and IS interpreting. For NGT interpreting, TU coded the lemma ID glosses and the exact start and end points at the same time. For IS interpreting, AN first coded the lemma ID glosses with no precise time code, and then TU reviewed this coding and adjusted the start and end time. Finally, AN did the transcript of parts of the spoken English lecture within the IS ELAN file. These parts were chosen in relation to qualitative observations made all along the coding process (see section 7.2 for the qualitative observations for lexical frequency).

Iterative enhancement

Using iterative enhancement, we tested the reliability of the annotation process (Dickinson & Tufiş, 2017). The lemma ID glosses are open categories decided by the annotators along the coding process. Unlike in the Chapter 3 study where the closed categories enabled automatic reliability coding, the use of open categories does not permit code validation in the same way. Therefore, considering our use of open categories as lemma ID glosses, we decided to detect coding errors and inconsistencies manually and through discussions between the two annotators (TU and AN) and the two supervisors OC and EO; i.e. iterative enhancement. One annotator first coded the NGT part, and AN

went through this coding to detect inconsistencies. Similarly, AN first coded the IS part and the NGT annotator then went through this coding, adjusting the time code and pinpointing inconsistencies. In addition, throughout the process, we frequently checked the progress of the coding process with each other and discussed and resolved any uncertainties.

Analysis

After coding in ELAN, we exported the lemma ID glosses to an Excel file. Each entry (lemma ID gloss) was put under the column “type” (i.e. first occurrence of this lemma). Then, the number of occurrences of the lemma ID glosses was added under the column “token” (see Table 24).

Table 24. Extract: results for IS 1 interpreter in a table with the types (lemma ID glosses) and the tokens (count)

Type (or lemma ID gloss) – <i>v</i>	Token (or count) – <i>n</i>
have	25
see-2	15
animal	14
[...]	[...]⁹⁶

Note that the annotations for the NGT interpreting were created in Dutch, while they have been translated into English to support readers (see Appendix 5 for the original values and translations). Finally, a Chi-Square test was conducted with a Monte Carlo approach to assess the significance of the observed differences in the frequencies (Biber et al., 1998). The Chi-Square analysis was performed using SPSS (Pallant, 2013).

Results: lexical diversity

Lexical diversity: quantitative results

As discussed above, we used the Type-Token Ratio (TTR) to compute and compare the lexical diversity of NGT and IS interpreting. As shown in Table 25, for the relay “Mass extinction”, the lemma ID glosses amounted to 165 types and 435 tokens for the IS 2 interpreter, while the NGT 2 interpreter had 290 types and 750 tokens. For the relay “Climate change”, the IS 1 interpreter had 179 types and 481 tokens, while the NGT 1 interpreter had 309 types and 778 tokens. For both interpreting relays, the pool of lexical signs used by the

⁹⁶. The full table is presented in Appendix 5.

NGT interpreters is almost twice that of the pool of lexical signs used by the IS interpreters.

Regarding the lexical diversity resulting from the relay “Mass extinction”, the IS 2 and NGT 2 interpreters have a TTR of 0.38 and 0.39 respectively. For the relay “Climate change”, the IS 1 and NGT1 interpreters have a TTR of 0.37 and 0.40 respectively. In both relays, the IS interpreting TTR is smaller than that for NGT interpreting (see Table 25). These differences are too small to draw a strong conclusion. The TTR is sensitive to text length of the interpreting output; the longer the text the lower the TTR (e.g. McCarthy & Jarvis, 2007). However, there is no agreement on how to correct for text length with TTR computation. Our outcomes indicate that, within our dataset, IS and NGT interpreting behave similarly in terms of lexical diversity, showing that IS displays a language-like pattern. This finding about IS contrasts with those of previous studies that did not directly compare IS with another national sign language.

Table 25. Type, token and TTR results for the interpreting relays “Mass extinction” (IS 2 and NGT 2) and “Climate change” (IS 1 and NGT 1)

	Interpreters	Type (v) (lemma)	Token (n) (number of occurrences of the lemma)	TTR
Interpreting relay “Mass extinction”	IS 2	165	435	0.38
	NGT 2	290	750	0.39
Interpreting relay “Climate change”	IS 1	179	481	0.37
	NGT 1	309	778	0.40

Lexical diversity: some qualitative observations for IS interpreting

In order to give meaning to our quantitative data, in this section we compare examples demonstrating the use of lexical signs in IS interpreting with NGT interpreting.

Example 1: using lexical signs from different sign languages

This example comes from the start of the conference where the host introduces the lecturer and the topic. Figure 32 shows that the IS interpreter chooses to repeat the concept of “conference” by chaining together two different lexical signs glossed as conference-1 and conference-2, while the NGT interpreter only uses the lexical sign conference once. Repeating the same concept in two different forms has been documented many times by researchers and interpreters (see Moody, 2002; Rosenstock, 2008).

In this example, according to the language repertoire of the lead IS interpreter, the lexical signs conference-1 and conference-2 are not part of the LSE core lexicon. From the audience's perspective, the lexical sign conference-1 is part of the NGT and VGT core lexicon, but not from CSL and LSFB. Furthermore, the lexical sign conference-2 is not part of any of the audience languages, i.e. NGT, VGT, LSFB and CSL.⁹⁷

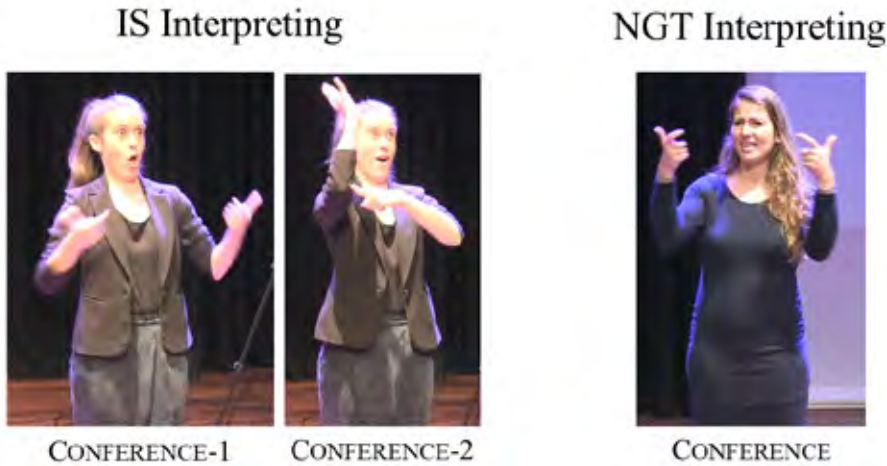


Figure 33. Comparing the use of the lexical signs CONFERENCE in IS and NGT interpreting

Example 2: using lexical signs in a token space

In this example, the speaker mentions the fact that animals were present in every "continent". While the NGT interpreter uses a depicting sign to refer to "continent", the IS interpreter uses three lexical signs in a row (America, Asia and Europe) to interpret the concept of "continent". In addition, these lexical signs are used in space, in a virtual map. This is what is referred to as "token space" by Liddell (1995).⁹⁸ Token space is used to assign specific locations in the signing space to referents. In our example, the IS interpreter places

^{97.} Our information is based on the online VGT dictionary (<https://woordenboek.vlaamsegebarentaal.be/> visited 24 October 2023), the online LSFB dictionary (<https://dicto.lsfb.be/> visited 24 October 2023), the online NGT dictionary (<https://www.gebarencentrum.nl/> visited 24 October 2023), and the website Spread the Sign for CSL (<https://www.spreadthesign.com/> visited 24 October 2023), in addition to deaf informants native in NGT, VGT, LSFB or CSL.

^{98.} As of note, Liddell (1995) distinguishes three spaces: real space (referring to the physical space around the signer), surrogate space (where the signer's body or space is used to represent other entities), and token space (an abstract representation where referents are assigned specific locations in the signing space).

America on her left side, Asia on her right, and Europe in the middle. Figure 33 illustrates this phenomenon.

IS Interpreting



NGT Interpreting



(DS)-Continent

Figure 34. Comparing the interpretation of the concept “continent” in IS (3 lexical signs) and NGT interpreting (1 depicting sign)

The first example illustrates how the IS interpreter uses *more* lexical signs to interpret the same concept, whereas the overall picture is the reverse, with NGT interpreters using more. Here again, quantitative results are nuanced as we show that the lower diversity of lexical signs in IS versus NGT does not hinder creativity in the use of lexical signs to convey meaning in IS.

Example 3: stressing the underlying iconicity of the lexical sign

In this example, the speaker describes the development of animals over time. Both IS and NGT interpreters used the same strategy to interpret this concept, i.e. the lexical sign animal. Moreover, the NGT lexical sign for animal has the same form as that used in IS interpreting. Yet, the way the interpreters produce it is different.

Figure 34 shows that the IS interpreter involves the whole upper body, head and face in enacting the walking of an animal, whereas the NGT interpreter only uses the hands to articulate an abstracted walking motion of two paws. The IS interpreter appears to be reactivating the ‘dormant iconicity’ of the lexical signs (see Sandler & Lillo-Martin, 2006) by ‘exaggerating’ the iconic

roots of this lexical signs (Moody, 2002). This phenomenon is not unique to IS and has been describes as 'de-lexicalization' by (Johnston & Schembri, 1999).

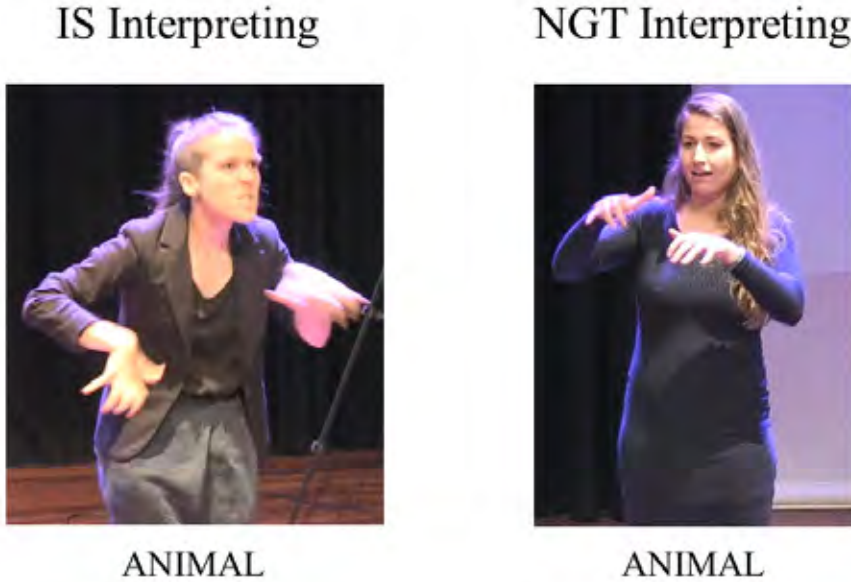


Figure 35. Comparing the use of the lexical sign ANIMAL in IS and NGT interpreting

Results: lexical frequency

Lexical frequency: quantitative results for IS interpreting

In this section, we present three types of analyses that give us different perspectives on the frequency results: the proportion of hapax legomena, the top 10 lexical signs used, with additional qualitative observations.⁹⁹

Lexical frequency: the proportion of hapax legomena

The first analysis is the proportion of lexical signs with one instance in the dataset; this is termed hapax legomena (see Johnston (2012) for Auslan; Whynot (2016) for expository IS). In corpus linguistics, hapax legomena is also referred to as 'singleton' (e.g. Forster et al., 2012). Table 26 shows that in the "Mass extinction" relay, hapax legomena represents 57.57% of all tokens for the IS 2 interpreter while this number decreases slightly to 55.17% for NGT 2. Concerning the "Climate change" relay, hapax legomena represents almost 49.16% of all tokens for the IS 1 interpreter, with 60.19% for the NGT 1 interpreter.

⁹⁹. The two full lists of hundreds of lexical signs used by the two IS and the two NGT interpreters are presented in Appendix 5.

Table 26. Results of hapax legomena in the relays of interpreters “Mass extinction” and “Climate change”

	Interpreters	Total number of types (v)	Hapax legomena (Absolute number and % of v)	Reiterated signs (Absolute number and % of v)
Relay “Mass extinction” (interpreting first)	IS 2	165	95 (57.57%)	70 (42.42%)
	NGT 2	290	160 (55.17%)	130 (43.83%)
Relay “Climate change” (interpreting in second)	IS 1	179	88 (49.16%)	91 (50.84%)
	NGT 1	309	186 (60.19%)	123 (39.81%)

In terms of absolute numbers, the total number of lexical signs used by the IS interpreters is about equivalent to half of those used by the NGT interpreters. This means that the most specific information bearing meaning in language, i.e. the lexical sign, is used half as often in IS than in NGT. This suggests that IS is constructed differently than NGT. Yet, in terms of relative numbers, the IS interpreters use hapax legomena and reiteration similarly to the NGT interpreters (e.g. from 39.81% to 50.84% of reiteration), suggesting that IS behaves similarly to NGT.

Furthermore, in both NGT and IS, we observe that hapax legomena exhibit the highest count yet the lowest frequency among the signs. Moreover, with increasing frequency, there is a decrease in the number of signs, as indicated in Table 27. This implies that the IS frequency pattern aligns with that of NGT and that both display language-like behavior (see Jarvis, 2013; Zipf, 1949).¹⁰⁰ Table 27 lists the counts of the frequency classes by the four interpreters. Here again, we see the hapax legomena followed by the counts in the higher frequency classes, with reduced counts in the higher frequency classes.

^{100.} Considering the relatively small number of tokens in our dataset (a few thousand compared to hundreds of thousands in corpora), we do not deem it pertinent to create a Zipf curve. See Kimchi et al. (2023) for Zipf curves for sign language large corpora (BSL, NGT and DGS).

Table 27. Counts of the frequency classes in the relays of interpreters “Mass extinction” and “Climate change”

Frequency	Interpreter				Total
	IS 2	NGT 2	IS 1	NGT 1	
1	95	160	80	186	521
2	31	48	41	54	174
3	17	29	12	22	80
4-5	6	24	17	22	69
6-7	4	18	10	6	38
8-10	7	5	4	10	26
>10	5	6	7	9	27
Total	165	290	171	309	935

When applying a Chi-Square test to the counts of the four interpreters, the result is not significant ($\chi^2(18)=28.173$, $p>0.05$). This indicates that IS and NGT interpreting behave similarly in terms of lexical frequency distributions in our dataset, showing that IS displays a language-like pattern. This contrasts with the findings of previous studies where IS was not directly compared with another national sign language.

Lexical frequency: the top 10 lexical signs

For the second analysis, the top 10 most frequent lexical signs were determined for both relays, i.e. “Mass extinction” IS 2/NGT 2 interpreters and “Climate change” IS 1/NGT 1 interpreters. Table 28 presents the top 10 lexical signs from 435 tokens of the different lexical signs for the IS 2 interpreter in comparison with the top 10 from 750 tokens for the NGT 2 interpreter.¹⁰¹

Table 29 lists the top 10 most frequent lexical signs from 481 tokens of the different lexical signs for the IS 1 interpreter and 7778 tokens for the NGT 1 interpreter.

^{101.} the interpreters took turn as followed: IS 2/NGT 2 interpreters and IS 1/NGT 1 interpreters. The numbers added to anonymize the interpreters do not follow the chronological order of the interpreters’ relays because we decided to follow the same code used in de Wit et al. (2022).

Table 28. The 10 most frequent lexical signs by the interpreting relay “Mass Extinction”, IS 2 and NGT 2 interpreters. Values highlighted in color are common in IS 2 and NGT 2 ¹⁰²

Rank	Type IS2 (v)	Percentage of tokens/count (n) n = 435	Type NGT2 (v)	Percentage of tokens/count (n) n = 750
1	see-1	7.82%	self	3.07%
2	decrease-4	6.21%	disappear-2	2.0%
3	animal	5.06%	species-1	1.73%
4	now	3.45%	animals	1.73%
5	disappear-1	3.22%	species	1.73%
6	before-6	2.30%	humans-2	1.47%
7	same-2	2.30%	plus	1.47%
8	before-2	2.07%	diversity	1.33%
9	decrease-2	2.04%	how	1.20%
10	about-3	1.84%	decrease	1.20%
Total		36.31%		16.93%

Table 29. The 10 most frequent lexical signs by the interpreting relay “Climate change”, IS 1 and NGT 1 interpreters. Values highlighted in color are common in IS 1 and NGT 1

Rank	Type IS1 (v)	Percentage of tokens/count (n) n = 481	Type NGT1 (v)	Percentage of tokens/count (n) n = 778
1	have	5.2%	animals	3.34%
2	see-2	3.12%	self	2.70%
3	animal	2.91%	imagine	2.19%
4	impossible	2.7%	also	1.93%
5	oh-2	2.7%	can	1.67%
6	oh-1	2.49%	other	1.54%
7	some	2.29%	live	1.54%
8	wait-1	2.08%	means	1.16%
9	place-1	1.87%	there	1.16%
10	same-1	1.87%	born	1.16%
Total	27.23%		18.39%	

¹⁰². “Indecipherable”, namely lexical signs the annotators could not find meaning for, were found at rank 5. For the presentation of the Top 10, they are not included; they appear in the full list in Appendix 5.

The breakdown (Table 28) shows that for interpreter IS 2, the 10 most frequent lexical signs cover 36.34% of the total of all 435 lexical signs used, while they only cover 19.95% of the total of the 750 NGT lexical signs used by interpreter NGT 2. And (Table 29) for interpreter IS 1, the 10 most frequent lexical signs cover 27.23% of all the 481 lexical signs while they cover 22.92% of all the 778 NGT lexical signs for interpreter NGT 1.

Within these top 10 most frequent lexical signs, overlaps occur between interpreters. For the interpreting relay “Mass Extinction”, the IS 2 interpreter has the lexical signs animal, disappear-1 and decrease-4 in common with the NGT 2 interpreter. For the interpreting relay “Climate change”, the IS 1 interpreter only has the lexical sign animal¹⁰³ in common with the interpreter NGT 1.

Concerning these overlaps between IS and NGT interpreters, it is even more striking that these overlapping lexical signs have the same phonological forms. This means that the lexical signs animal, disappear-1 and decrease-4 are produced in the same way by IS and NGT interpreters (see Figure 35 for decrease-4, Figure 36 for animal and Figure 37 for disappear-1). For the rest, we found no overlap between the top 10 lexical signs in IS and NGT.

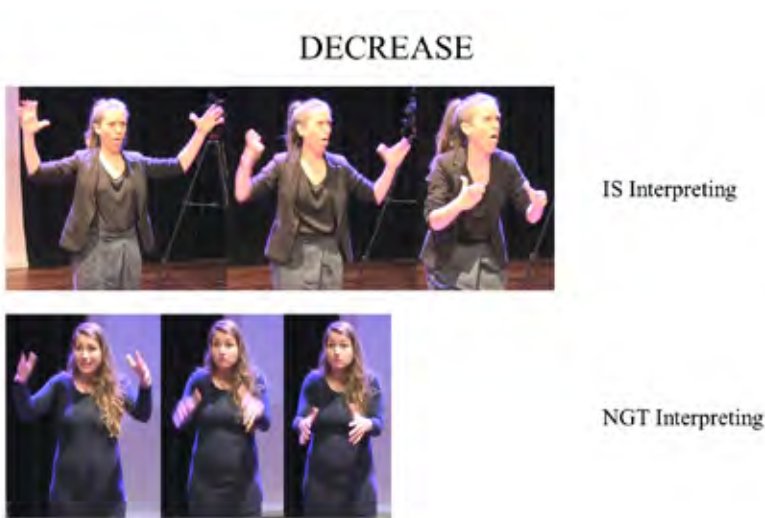


Figure 36. The same phonological form of the lexical sign DECREASE produced by IS and NGT interpreters

¹⁰³. Plural modification as an instance of morphology is not considered in glossing, as explained in section 5 “Method”.

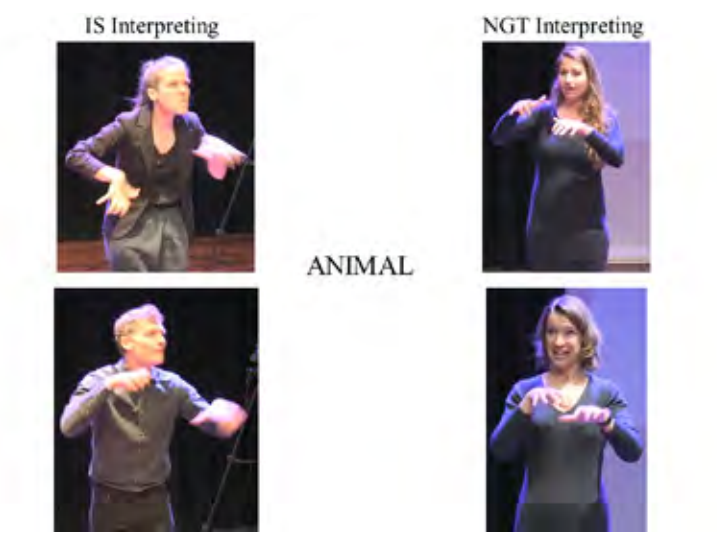


Figure 37. The same phonological form of the lexical sign ANIMAL produced by IS and NGT interpreters



Figure 38. The same phonological form of the lexical sign DISAPPEAR produced by IS and NGT interpreters

Lexical frequency: some qualitative observations

Finally, for the third type of analysis, we focus on two signs as part of the top 10 lexical signs of IS interpreting which provide insights into the construction of IS, highlighting some features of IS constructions in comparison with NGT. This analysis is a first step in this direction and could certainly be extended further in future research.

Example 1. The use of the lexical sign SEE

The lexical signs see-1 or see-2 are in the top 10 lexical signs for both IS interpreters, while we found no instance of see or similar-meaning lexical signs for NGT interpreters. Although, we did not focus on the spoken English source discourse, we coded some parts of it for the following four examples. In the two first (Figure 38), the presenter does not pronounce the word “see” or any other similar-meaning word, yet the IS interpreter uses the lexical sign see followed by a pointing sign to the referent. We observed no instances of this by the NGT interpreter working in parallel. This use of see followed by a pointing sign can also be seen as part of a ‘chaining’ strategy, where multiple semiotic elements are linked to support understanding and guide attention (Holmström & Schönström, 2018; Humphries & MacDougall, 1999/2000; Tapio, 2019).

In this case, the use of the lexical sign see appears to have the aim of keeping contact with the audience and guiding them along the interpreting process: “you see, here”, “stay with me and look here”, etc. This can be referred to as the phatic function of language, as framed by Jakobson (1960).

In the next example (Figure 39), the presenter refers to the slides: “In the example here in the slide, you can see [...]”. Here, IS and NGT interpreters both use the lexical sign see followed by a pointing sign referring to the slides.

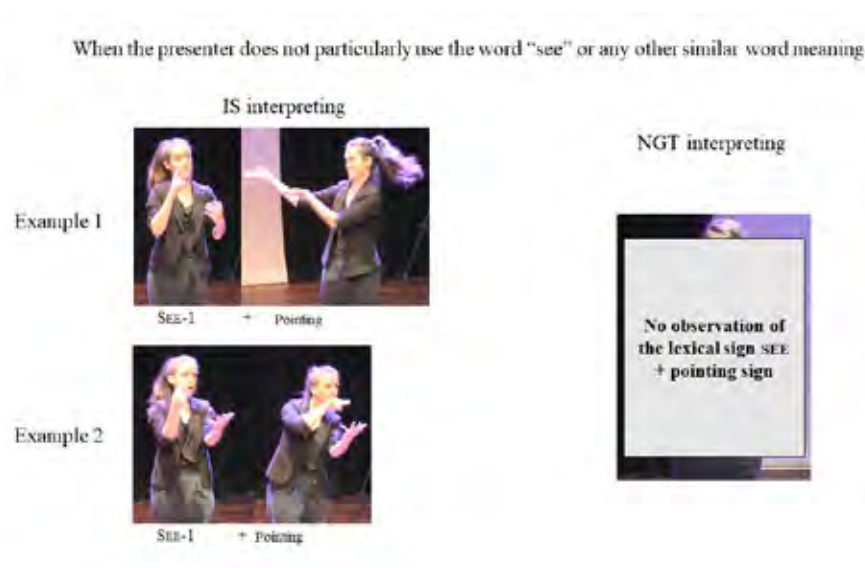


Figure 39. Use of the lexical sign SEE + pointing in IS interpreting even though the presenter does not use the word see or any similar-word meaning in his spoken English discourse; neither does the NGT interpreter use the lexical sign SEE

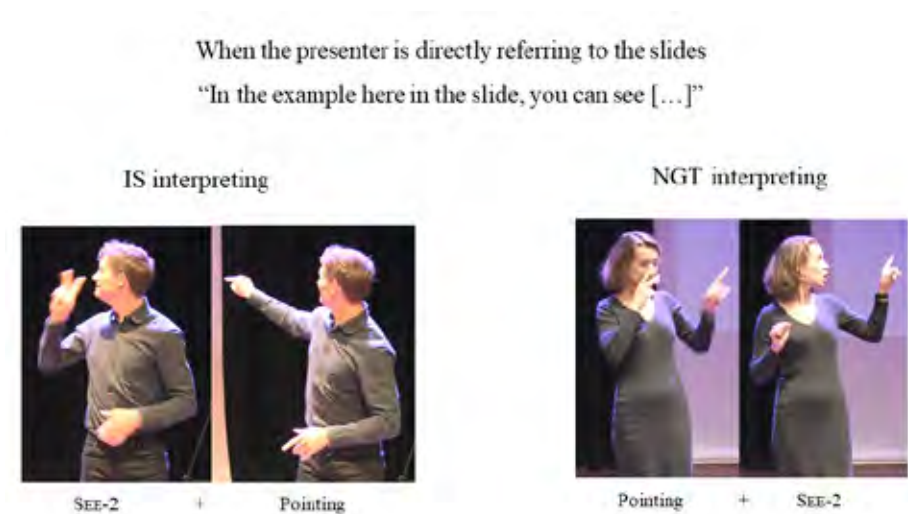


Figure 40. Use of the lexical sign SEE + pointing in IS and NGT interpreting when the presenter uses the word “see” and directly refers to the slides

However, in the example shown in Figure 40, the presenter also refers to the slides – yet, in a less direct manner: “There, you can see two examples [...]”¹⁰⁴ – and the IS and NGT interpreters convey the meaning in two different ways. While the NGT interpreter chooses to directly use the lexical sign example, the IS interpreter, again, chooses to use the lexical sign see followed by a pointing sign referring to the slides.

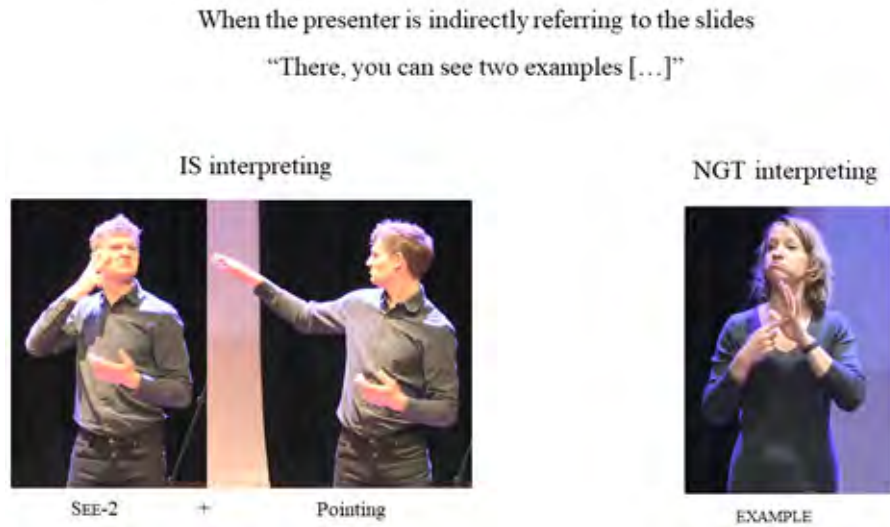


Figure 41. Use of the lexical sign SEE + pointing in IS when the presenter uses the word “see” and indirectly refers to the slides while the NGT interpreter does not use the lexical sign SEE and does not point to the slides

These two qualitative examples show partially why the lexical sign see is one of the 10 most frequent signs in IS interpreting. This deserves further research, however this first step suggests that the use of the lexical sign see in the IS target output is independent of the content of the English spoken source discourse.¹⁰⁵ Confirming McKee and Napier’s findings, IS interpreters would tend to make extra use of the real-world to locate or point to a referent in comparison to NGT interpreters who can convey meaning without referring to the real-world if not needed (see McKee & Napier, 2002).

Example 2. The use of the lexical sign OH

In the top 10 lexical signs for interpreter IS 1, we observe the lemmas coded as oh-1 (one hand shaking) and oh-2 (two hands shaking). Digging into our dataset, we found different uses of these lemmas; they can either be used as

^{104.} “There” refers to the slides.

^{105.} As mentioned in part 5 “Method”, we coded parts of the source discourse for the purpose of qualitative observation.

an indicator of intensity or a way to convey an emotion. In both cases, these signs could have been replaced by a facial expression; in fact this lexical sign is commonly combined with a facial expression. This combination of lemma and expression is typical of IS emphasis strategies (see McKee and Napier, 2002). When comparing this interpreted chunk of the discourse with NGT interpreting, we found no examples of this use of these lexical signs in NGT.

In the example presented in Figure 41, the IS interpreters use the lexical sign *oh* as a way to convey an emotion. Here, the presenter mentions that DDT was supposed to have disappeared a long time ago, but nowadays “we still find traces of DDT in the tissues of some animals [...]”. While the NGT interpreter fingerspells D.D.T and signs *inside*, the IS interpreter also fingerspell D.D.T, but continues signing how impossible it is to remove DDT from the animal’s body. To convey this meaning the lexical signs *impossible* and *oh-2* are used. This use can be seen as a comment on how bad these remaining traces of DDT are. This comment is not explicitly mentioned by the presenter i.e., no specific words are used in this sense and/or no stress in the prosody, yet this comment added by the IS interpreter is totally in tone with the content of the discourse. As Lederer and Seleskovitch noted, the interpreter translates meaning and the locutor’s intent (Lederer & Seleskovitch, 2014). This addition from the IS interpreter falls under the presenter’s intent.

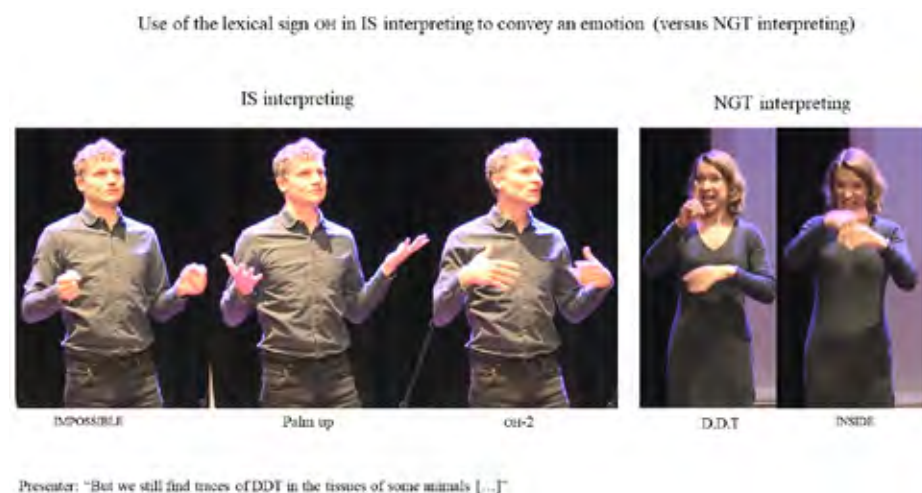


Figure 42. Use of the lexical sign *OH* to convey an emotion in IS interpreting versus NGT interpreting

In the fourth example (Figure 42), the presenter talks about the different means available to protect animals and that, “some of the actual means are extremely expensive”. While the NGT interpreter uses two lexical signs to show how expensive these means are – i.e. very bad and expensive – the IS interpreter uses three lexical signs money, oh-2 and increase-4. In this case, we assume that money and increase-4 would have been sufficient to convey the meaning, however the IS interpreter chose to use the lexical sign oh-2 in addition to convey the intensity of the expense.

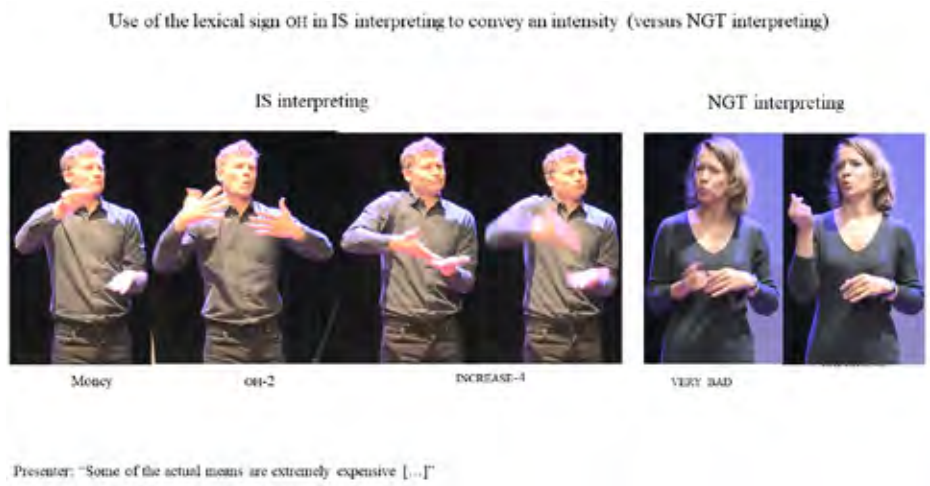


Figure 43. Use of the lexical sign OH to convey an intensity in IS interpreting versus NGT interpreting

Discussion

Our results challenge the general sentiment on IS lexicon which has been described as ‘impoverished’ and ‘limited’. We operationalized both words in terms of lexical diversity and lexical frequency and find that these terms no longer suffice. In addition, we observed lexical diversity and lexical frequency in IS interpreting in direct comparison with NGT interpreting. This supports our results as NGT, unlike IS, is considered as a full-fledged language and has been relatively well documented (Klomp, 2021). Therefore, our results on IS can be placed in the perspective of this NGT point of reference. This comparison therefore provides novel information about the construction of IS. Previous qualitative studies report that IS tends to minimize the use of lexical signs as IS does not have a core defined lexicon; hence, IS gets its lexical signs from multiple national sign languages. The results of our study show how the use

of lexical signs in IS compares to NGT based on TTR for lexical diversity and hapax legomena for lexical frequency.

In our analysis of lexical diversity, we report that the lexical diversity ratio gap between IS and NGT interpreting is small and not statistically significant, i.e., 0.37 and 0.38 for IS interpreting and 0.39 and 0.40 for NGT interpreting. Thus on a macro level, IS interpreting uses fewer lexical signs than NGT interpreting, 59.9% versus 80.2% respectively (see Chapter 3). In contrast, when investigating what underlies these scores on a micro level, IS interpreting lexical diversity does not radically deviate from NGT interpreting. This was confirmed by the Chi-Square test, showing a non-significant difference of lexical diversity between IS and NGT interpreters. In summary, within their own pool of lexical signs, IS interpreters reiterate lexical signs as much as NGT interpreters do with their own pool of lexical signs.

Concerning lexical frequency, the percentages of hapax legomena for IS and NGT interpreting are close, i.e., 18.48% and 21.85% for IS interpreting and 22.4% and 24.18% for NGT. Again, this means that within their pool of lexical signs, IS and NGT interpreters closely behave in the same way when it comes to using a lexical sign once. However, the difference is more substantial when we observe the percentage of tokens covered by the 10 most frequent signs in IS and NGT interpreting. For IS interpreting, these cover 27.23% and 36.34% of all tokens, while NGT interpreting cover 20.78% and 22.92%. This shows that IS interpreting with the same absolute number of lexical signs, i.e. 10, conveys more meaning than NGT interpreting.

In general, these quantitative percentages and the differences between IS and NGT interpreting do not appear to show that IS interpreting radically differs from NGT interpreting. However, our qualitative observations show a more striking difference, i.e., the productions of the lexical signs. Figures 36 and 37 show that the IS interpreters involve their bodies more than the NGT interpreters. For instance, the lexical signs representing animal and disappear (animal and disappear-1 in IS and animals and disappear in NGT) have the same form in IS and NGT: animal = animals and disappear-1 = disappear. Yet, for the lexical sign animal, we see that while the NGT interpreter stays in a neutral position, the IS interpreters lean forward and more widely spread their hands on the space. In this way, they revive the 'dormant' iconicity in the sign. And, for the lexical sign disappear[-1] used in IS, we see that despite the form is the same in NGT, the NGT interpreter's position is neutral while the IS interpreter

produces this lexical sign with her body standing up at the beginning of the sign and her body standing down at the end. This supports McKee and Napier's findings about the increase of the signing size or volume of IS interpreting in comparison to a national sign language interpreter (McKee & Napier, 2002). This is a rich area for future research to study this systematically. Lastly, our study complements McKee and Napier's findings on the use of space showing an instance of mapping (see Figure 33).

The interpretation process is thus not about the form of words or signs, but about the interpreter extracting the meaning of the words and signs. This process has been called the *deverbalization* phase by Lederer and Seleskovitch (2014). In Figure 33, the example with the interpretation of the word "continent" by the IS interpreter shows a perfect example of the combination of deverbalization plus use of space. This shows how IS can make use of lexical signs with no word to sign an equivalent relationship as was the case for the production of NGT. Here again, the IS interpreter uses similar lexical signs to those of the NGT interpreter, yet in a different way.

To close, it should be noted that our study has focused on IS in the context of interpreting in comparison to one specific national sign language, NGT and left out the audience's perspective (comprehension part). The temptation could be to generalize our finding as we know that IS shares common features across its different settings (e.g., cross-signing, expository IS) similarly to how NGT shares common features with other national sign languages. In addition, the pool of interpreters is small, i.e. 2 of the 135 recently listed by Wit et al. (2021a), although they are both either accredited or pre-accredited by WFD-WASLI to interpret from English to IS.¹⁰⁶ Notwithstanding its limitations, we note that IS interpreters behave more similarly to national sign language interpreters than was once thought, as the nature of IS may have changed in recent decades, and as it continues to evolve (Wit et al., 2023). Thus, we show that the use of lexical signs in IS is not as parsimonious as the term "impoverished" suggests.

Conclusion

We opened this study with the general statement that IS lexicon is known to be 'impoverished' (Allsop et al., 1995). To breakdown these terms 'impoverished' and 'limited', we investigated the use of lexical signs in IS interpreting in

¹⁰⁶. See Chapter 1 "Introduction" for the presentation of the WFD/WASLI accreditation system.

comparison to their use in a national sign language (NGT) in an interpreting setting. Two aims were addressed: firstly, providing comparative quantitative results on IS and NGT interpreting for lexical diversity and secondly, for lexical frequency. The added value is that we compared IS interpreting lexical sign features with NGT interpreting, which served as a point of reference and gave perspective to our findings. Previously, the features of IS have not been compared with national sign languages (McKee & Napier, 2002), or in those cases where a comparison was made, unrelated datasets were compared (Wynot, 2016). We uniquely show that our IS interpreting findings can be directly compared with NGT interpreting thus directly informing us whether IS deviates from NGT. In addition, this study targeting IS interpreting adds new literature to the field of signed communication, an area which has been much less studied and documented than national sign languages.

First, we addressed the so-called ‘common knowledge’ on IS lexical diversity which has been reported as being ‘limited’ and ‘impoverished’ in comparison to national sign languages. Thanks to this assumption, IS has tended not to be considered as a full-fledged language by the majority of stakeholders - signers, linguists, interpreters and deaf activists (Hansen, 2016). We have addressed both terms through the lens of the lexical diversity of IS interpreting. In our dataset, we show that the pool of IS lexical signs is less diverse than the pool of NGT lexical signs; namely, IS interpreters reiterate the same lexical signs more often than their NGT counterparts. Yet the lexical diversity gap between IS and NGT interpreters is small, with only a few hundredths separating the two. The fact that we found that IS does not radically differ from the national sign language NGT in its lexical diversity aspect supports Rathmann and Müller de Quadros (2023) who consider IS as a language, i.e. *IS language*. This is discussed in depth in the final thesis Chapter “Final discussion and conclusion”.

Second, we are first to yield results on IS lexical frequency in the context of interpreting, following up on the study on lexical frequency in IS lectures conducted by Whynot (2016). Our dataset included two lists of hundreds of lexical signs used by the two NGT interpreters and two other lists for the two IS interpreters. We then calculated the 10 most frequent lexical signs used. These two complete lists of lexical signs used by the two IS interpreters add to the list of 200 hundred lexical signs provided by Whynot (2016) in the context of expository IS (namely IS lectures). A following step would be to compare the overlap between our lists and Whynot’s. The lexical signs common to each list,

i.e., those which appear in different IS contexts, can be considered as part of the core lexicon.¹⁰⁷

Our detailed results can be directly implemented by different IS users: interpreters, teachers, deaf attendees, etc. The lexical frequency results inform us on the way the locutors produce and comprehend the lexical signs used. One of the direct implications would be to implement these findings when designing a curriculum for IS learners. Furthermore, we introduce three possibilities for researchers to extend on our work using our open-access datasets and annotated files. These include one with the results from the lexical diversity part, and two with the results from the lexical frequency part.

First, the lexical diversity analysis could lead to lexical variation analysis. Lexical variation means that different forms of signs are used to convey the same meaning (Lucas et al., 2003; Safar, 2021; Stamp et al., 2014). In our dataset, lexical variation is illustrated in Figures 30 and 32, with the lexical signs more and conference. The variation of the form of the lexical sign is shown with the number suffixation, e.g. more-1, more-2, more-3 as explained in the methods section. By exploring lexical variation in IS, we could gain a greater understanding of the characteristics of IS. In addition, this would directly feed IS users in their flexibility to produce and comprehend IS by knowing a range of different lexical signs.

Second, as described in the method section, the coding of the lemma ID glosses was precise in terms of time code. Therefore, the correlation between sign length and frequency could be further explored. More specifically, we know that there is a correlation between frequency and reduction of the sign, i.e., the more frequent a sign, the shorter it is as noted by Börstell (2016 for SSL for instance. This is also true for spoken languages, the more frequent a word, the more reduced in duration it is (Bybee, 2017)). Observing whether IS would differ or follow this well-known frequency/length reduction pattern in a direct comparison with NGT will document another unstudied aspect of IS.

¹⁰⁷. Regarding the interest in establishing the core IS lexicon, see Chapter 6 “Final Discussion and Conclusion”.

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Chapter 5

Interference: A case study of lexical borrowings in international sign interpreting

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Abstract

In simultaneous interpreting studies, the concept of interference – namely, the marks of the source language in the target language – is perceived as a negative phenomenon. However, interference is likely to happen at a lexical level when the target language does not have its own lexicon. This is the case in international sign (IS), which can be defined as a mix of different sign languages, in which the lexical items are not fixed. This qualitative study analyses a dataset of interpretation from Sign Language of the Netherlands (NGT) to IS by a team of two Dutch, deaf interpreters at an international conference in Nijmegen, the Netherlands. We observed the occurrence of source NGT lexical items borrowed into the IS target output and considered the strategies used in this. The phenomenon was found to be recurrent. In addition, depending upon the type of lexical items, the strategies used to borrow NGT lexicon were found to differ. Thus, we have described the set of strategies and examined the results in comparison with previous findings. As a practical output, this study could inspire current and future IS interpreters to expand their set of interpreting strategies.

Introduction

In simultaneous interpreting, interference is the mark of the source language in the target language, in which some characteristics of the input still appear in the output (Pöchhacker, 1994b). Previous studies on simultaneous interpreting have shown that there is a high risk of interference between the source language and the target language during the interpretation process (Agrifoglio, 2004). This is mainly due to time pressure, and it varies depending upon factors, such as the direction of the interpretation process (Dailidénaitė & Volynec, 2013). The interference can occur at a phonological-, grammatical-, or lexical level (Lamberger-Felber & Schneider, 2008). Interference at a lexical level is likely to occur when the target language does not have a conventionalized lexicon to fill this gap.

Situations in which communicative partners do not share (all of) a lexicon are not uncommon. This applies in English as a *lingua franca* for spoken languages, as well as in international sign for signed languages (see Bierbaumer, 2021 for similarities between English as a *lingua franca* and international sign).

In English, as a *lingua franca*, fully shared lexicons do not exist, because this is very much dependent upon the context. Researchers have observed a variety of different forms across different domains, groups, and situations. In international sign, there is also no fixed lexicon (Allsop et al., 1995b), because international sign integrates lexical items from other established national signed languages. Studies have indicated a high percentage of the use of lexicons from the sign language of the country, in which the communication takes place (see Monteillard, 2001, for international sign communication in France, for instance). Our study considered the ways in which this gap was filled in international sign.

International sign (IS) is defined as a mix of different sign languages that reduces the use of lexical items in favor of other ways of expressing meaning. This is why most previous studies of IS have focused on its broader (non-lexical) iconicity (the resemblance link between the referent and the sign,¹⁰⁸ see Baker et al., 2016), rather than on the role of the lexicon (R. McKee & Napier, 2002; Rosenstock, 2008). In addition, previous studies involving IS interpreting have mainly focused on interpretation from spoken-English to

^{108.} For a non-sign language linguistics audience, signs in signed languages can be the equivalent of words for spoken languages.

IS (R. McKee & Napier, 2002; Moody, 2002; Rosenstock, 2008). What has been little studied (despite e.g. Stone & Russell, 2016), is interpreting from a national sign language to IS, with a focus on the lexicon content in IS. This is the focus of our study.

For this study, we chose to investigate a specific case of lexical interference in simultaneous interpreting. Our data was derived from a team of two deaf interpreters, who worked from Sign Language of the Netherlands (Nederlandse Gebarentaal: NGT) to IS, and who were active in a conference setting. We investigated if lexical interference from a source NGT discourse to a target IS discourse occurs. And, if so, we identified the set of strategies used to import source NGT lexical items to the IS target. This knowledge could be used to enhance the toolbox of current and future IS interpreters.

Characteristics of international sign

Collectively, deaf communities across the world communicate using at least 140 different sign languages (Eberhard et al 2021). These signed languages show similarities in overall grammatical structure that likely stem from the shared modality, but they are not fully, mutually intelligible (Sáfár et al., 2015). Therefore, when deaf people from different countries meet and do not share a national sign language, they tend to communicate in IS (Hiddinga & Crasborn, 2011). IS is an umbrella term that refers to a combination of sign languages that leverages the iconicity present in every sign language (Rosenstock, 2008).

Current literature broadly refers to two types of IS: conventional IS (referring to IS interpreting or expository IS, one presenter directly expressing ideas in IS), and spontaneous IS (also referred to as 'cross-signing'). Cross-signing is the dynamic bilateral or multilateral interaction of deaf people without a shared sign language (Zeshan, 2015). It allows them to negotiate meaning throughout the communicative interaction. IS simultaneous interpreting (R. McKee & Napier, 2002) or expository IS (Whynot, 2016) is more conventionalized, because it is mainly a unilateral interaction that is produced under more intense time pressure, by signers and interpreters with experience in this. This paper, thus, addresses IS simultaneous interpreting, rather than cross-signing.

With regard to IS as a general term, some interpreters might call it a '*language*', while linguists tend not to. Linguistic studies do not agree on the linguistic

status of IS (Hansen, 2016). Some experts have likened it to a Creole language (Supalla & Webb, 1995b), while others have associated it with a pidgin language (R. McKee & Napier, 2002). Indeed, IS is more of a language contact phenomenon, rather than a fixed language (Whynot, 2016; Kusters, 2020). IS is supposed to provide a means of communication that plays the role of a *lingua franca*, and is understood by as many people as possible.

McKee and Napier (2002) have identified that the main challenge with IS interpreting is lack of a defined lexicon (p. 48). Indeed, as a contact language phenomenon, IS has an '*impoverished lexicon*' (Allsop et al. 1995, p. 187), even though it has its own grammar (as demonstrated by Supalla and Webb, 1995). However, its lexical items (i.e. its signs) vary depending upon the context - Where IS takes place, who is producing IS, and who is receiving IS. For instance, Monteillard (2001) found that the expository IS used by a deaf Danish person and a deaf American person at conferences in France between 1993 and 1999 were almost 50% comprised of French Sign Language (LSF) signs:

"We must first highlight the use of signs borrowed from the local sign language, in this case, in our video corpus, the standard signs of the LSF, these conferences having taken place in France" (p. 7).¹⁰⁹

In addition, Sheneman and Collins (2016) found relatively many American Sign Language (ASL) signs in expository IS produced by three deaf African signers in the USA in 2012: '*[...] the use of IS, considered as a mixture of their own native sign language and the hosting country's sign language [...]*' (p. 168). Based on these studies, we have inferred that signs from the local context are frequently included as part of IS.

However, previous studies on the type of IS interpreters use have mainly focused on the grammar and iconicity that is common in many sign languages (e.g., Moody, 2002; Rosenstock, 2008; Stone & Russell, 2016). Indeed, to create widely understandable communication, IS interpreters take most advantage of iconicity and tend to reduce the use of lexicon to '*[...] think beyond known lexicon [...]*' (Oyserman, 2016, p. 192). This is because lexicon is often perceived as '*the most variable and least transparent aspect of international sign communication,*' (McKee & Napier, 2002, p. 41), so it is not ideal for comprehension by signers using different languages. However, lexicon from any given national sign

¹⁰⁹. Translation from French to English proposed by the author of the dissertation.

language is likely to be part of the IS output. In other words, target IS output is likely to contain lexical interference from the source local sign language ('local' being understood as the country, in which it is being used).

To produce this target IS output, one umbrella strategy of IS interpreting is to emphasize meaning to ensure clarity (see McKee & Napier, 2002; Rosenstock, 2008). For instance, this can be done by '*making the abstract more concrete*,' (McKee & Napier, 2002, p. 43), or by using different expansion techniques (as highlighted by Lawrence, 1994) for English to American Sign Language (ASL) interpreting. Still, expansion techniques, as highlighted by Lawrence (1994) and based on ASL, largely apply to IS as well (see Best and al., 2016; McKee and Napier, 2002). Therefore, in this present study, the analysis will also make use of this lens.

Lawrence (1994) first introduced the concept of expansion in discussing interpreting from English to ASL. Expansion relates to the different techniques with which ASL (and many other sign languages) structures the discourse in a way that is not possible in spoken English. For instance, she describes the 'couching, or scaffolding' technique (a group of signs grouped together to form a concept), 'reiteration' (a sign repeated in exactly the same way), and spatial mapping (in which a location is indicated in the signing space).

During the presentation of our findings below, we relate these strategies with aims that we have extracted from our dataset. We organized the aims into four categories: explain, contextualize, describe, or guide. Within the aims, different strategies can be observed with some of them related to the previous findings. We present the categories separately, but they can overlap.

In the next section, we briefly discuss the concept of interference with the lens of IS, and present the research questions that this study aims to address.

International sign and the concept of interference

In spoken languages, Weinreich (2010) defines interference as;

"[...] deviations from the norm of either language that occur in the speech of bilinguals as a result of their familiarity with more than one language" (p. 1).

However, as discussed above, we cannot determine a norm for IS, because research shows that IS, as an instance of language contact, varies with the context. Kusters (2020) qualifies IS as a signing communication that is; '*porous for dominant influences*' due to its '*not [being] a language*' status. Then, this dominant influence can emanate from a national sign language that has a language status (NGT, in this study).

Besides, in any interpreting, there is also language contact between the source input (here, NGT) and the target output (here, IS). The interpreter processes two streams of discourse simultaneously: understanding and producing. We also know that translated text (written modality) is generally of a higher quality than an interpreted discourse (oral modality). This is due to the high degree of interference in simultaneous interpreting (see Kroll & Groot, 2009). Indeed, the time pressure of simultaneous interpreting might lead to marks of the source language in the target one. These marks can appear at a grammatical or lexical level (see Lamberger-Felber & Schneider, 2008).

With regard to this literature, interference has a pejorative connotation (Seleskovitch & Lederer, 1989). It is perceived as a negative phenomenon, a "[...] contamination [of the target text] with the source-culture material" language (Pöschhacker, 1994b, p. 176). Here again, the term 'interference' as a negative phenomenon cannot apply to IS interpreting, because IS, is, in essence, influenced by many other sign languages, which may also include the source language.

Therefore, in this study, we prefer to use the word '*influence*' instead of '*interference*' to avoid the negative connotations of the latter term, which are often present in the literature. This '*influence*' is twofold: the simultaneous interpreting situation from NGT to IS, and the use of IS as a mix of sign languages for an international audience.

Given that IS does not have its own lexicon, "signers, therefore, have to decide whether to use signs from their own language, or from another sign language [...], or one of the few signs recognized as conventional in IS" (Adam, 2012, p. 853).¹¹⁰ Therefore, in this qualitative study, we address the following questions:

^{110.} IS does not have its own lexicon although it may have inherited some from the list of lexical items named Gestuno (British Deaf Association, 1975). Gestuno might be seen as the first step toward IS. In the 1950s, the World Federation of the Deaf (WFD) felt the need to construct a standardized sign language to be used at international Deaf events such as conferences. By the 1970s, they had published the first Gestuno manual, containing around 1500 signs. It was first put to the test in 1976, at the WFD congress in Bulgaria, but it was barely comprehensible by most attendees, and it was not used thereafter. However, Monteillard (2001) and Whynot (2016) identified some Gestuno signs in their datasets from the 1990s and 2011.

- *Did the two Dutch deaf interpreters import source NGT signs into the target IS output? If so, is this phenomenon recurrent or isolated?*
- *If Dutch deaf interpreters imported source NGT signs into the target IS output recurrently, what strategies did they use in this?*

Methodology

Dataset

In 2018, we collected a dataset from a 40-minute inaugural lecture on the professional journey of a sign language linguist at Radboud University in Nijmegen, the Netherlands¹¹¹. This sign language linguist, the second author of this study, is a hearing late learner of NGT and a former Dutch/NGT interpreter. He presented his inaugural lecture as a Professor in NGT at Radboud University. Simultaneously, this lecture was interpreted from NGT to spoken Dutch by a team of two hearing interpreters, and from NGT to IS by a team of two Dutch deaf interpreters. The two deaf interpreters received the NGT source language via a screen. In addition, a hearing interpreter offered back-up support for the deaf interpreters' team. Each deaf interpreter had an interpretation relay of 20 minutes.

The two deaf NGT to IS interpreters and the hearing back-up interpreter did not receive any information on the research question of our study. They only knew the title of our research project: '*Deaf communication without a shared language*', which was public information. However, they knew in advance who were going to be the deaf people in the IS audience. Actually, the interpreters received a really good preparation before the event. They received the slides of the lecture and the signing video of the professor beforehand. Then, one hour before the lecture, they met together in a room for one final preparation phase. Finally, all the participants (presenter and interpreters) gave consent to participate in this study and agreed with the display of fragments of their work for scientific dissemination.

¹¹¹. The data that support the findings of this study are available at https://archive.mpi.nl/tla/islandora/object/tla:1839_02f9ac43_1b1f_4ceb_ac6f_fad9db493605?asOfDateTime=2021-10-19T17:09:51.505Z, upon reasonable request.

From the audience's perspective, the IS interpreters were situated to the left of the screen where the slides were displayed. The lecturer stood to the right of the screen. Therefore, the interpreters and the lecturer were both standing next to the screen and could refer to the slides if required. Figure 43 illustrates this setting, focusing on the IS target (we dismiss the interpreting from NGT to spoken Dutch). We set up two cameras: one on the NGT presenter and one on the IS interpreter.

The lecture was addressed to a large, mixed (hearing and deaf) audience that included academic (researchers, professors, etc.) and non-academic (family and friends) attendees. The audience were mainly from the Netherlands, with a few from other countries. The IS interpreting targeted a deaf audience from Flemish Belgium (Vlaamse Gebarentaal: VGT), Germany (Deutsche Gebärdensprache: DGS), and the USA (American Sign Language: ASL). Both interpreters have ASL in their language repertoire, in addition to NGT (native signers) and IS.

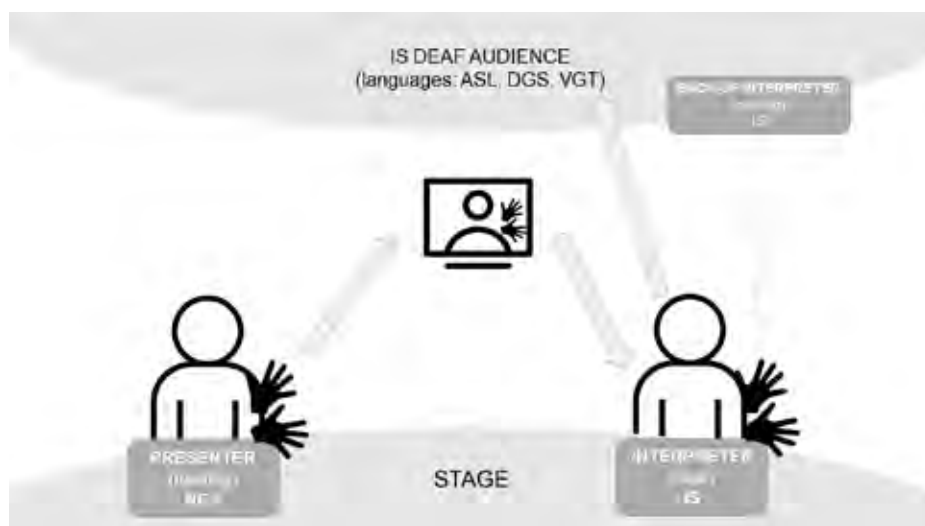


Figure 44. Interpreting setting

Analysis

Due to the time-consuming nature of the analysis, we only analyzed the first ten minutes of each interpreter's relays (20 minutes in total), half of the full dataset (40 minutes length)¹¹². The video footage was annotated using ELAN software.

¹¹². Note that coding IS interpreting data is time-consuming. In comparison to what has been done before, McKee and Napier (2002) have analyzed 14 min of authentic IS interpreting data, and Rosenstock (2008), 10 min of experimental IS interpreting data.

Firstly, we examined the lexical influence of NGT signs on the IS output. In this, we reviewed the NGT source discourse and then the IS target, and searched for sign borrowings. Using the same glossary, we annotated each source NGT sign borrowed in the target IS and the original sign in the NGT source. In parallel, a researcher, who is a deaf native signer of NGT, annotated our dataset with the NGT signs (without access to our annotation). We requested review of the IS interpreting output and notation of what she considered to be NGT signs. Afterwards, we could confirm if the signs we first spotted as NGT sign borrowings were indeed lexical.

Then we added two other tiers related to the IS target to annotate the way in which these NGT signs were borrowed. We distinguished between the sign borrowings imported with added extra strategies (one tier) and the ones without any (a second tier); see Figure 44.

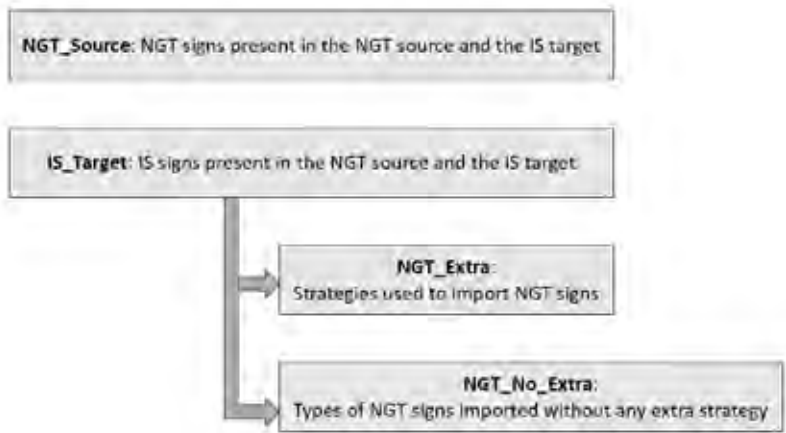


Figure 45. ELAN tiers

For the analysis of the sign borrowings imported without any strategy, we considered the hypothesis that it might be because these signs overlap with the sign languages of the audience. Therefore, we asked a deaf native signer of each sign language represented in the target IS audience, ASL for the USA, DGS for Germany, VGT for Flanders Belgium to annotate if any given sign is part of the lexicon of their own sign language.

The deaf native ASL signer reviewed the full recording of the IS interpreting dataset and annotated the ASL signs. For the DGS and VGT signers, we proceeded differently for making a quicker process for the participants. We recorded all the signs borrowed without any strategy and asked them if each sign could be labeled as a lexical sign in their own sign language. Then, we repeated this with the signs imported with extra strategies in order to test our hypothesis.

Findings

During the 20 minutes of the recording that were annotated, we found a total of 100 different source NGT signs borrowed into the target IS output by IS Interpreter 1, and a total of 152 by IS Interpreter 2. However, many of these signs were used several times during the interpretation relay. That the case of the sign study, for instance. It has been used up to three times but we counted it as one. Dismissing the repetitive uses of this sign, there was a total of 65 unique source NGT sign types borrowed by IS Interpreter 1, and a total of 78 unique NGT signs by the IS Interpreter 2. There could have been some overlap between signs imported by IS Interpreter 1 and IS Interpreter 2, but our analysis focused on results per interpreter.

The interpreters chose to use additional strategies to borrow some NGT signs and to use no additional strategy for others, importing NGT signs straight away.

NGT Lexicon Imported with Extra Strategies

To present the different strategies interpreters used to borrow NGT signs into IS, we chose to relate them to the possible *aim* behind the chosen emphasis strategy. The emphasis strategy can be triggered by the aim to explain, contextualize, describe, or guide. Within these aims, different strategies can be observed, and some of them relate to the previous findings detailed above. We have presented the different categories separately, but there can be overlap among them.

Explanation

Explanation means clarifying the NGT sign imported to the IS target.

Example 1: NGT. officer > IS.officer¹¹³ (see Figure 45). The lecturer welcomed and thanked attendees, including the officer of the University. The interpreter chose to import this officer sign to her IS target output. She imported it by explaining the sign: this person is in a high position that is related to the university.

In case of confusion, in the photos that we have presented, the lecturer is a left-handed signer, and the interpreters are right-handed.



Figure 46. Officer from NGT to IS interpreting

Here, the interpreter chose to group the sign representing a 'person in a high position' with the sign university to build the concept of officer. This relates to the expansion technique of 'couching, or scaffolding' (Lawrence, 1994).

Example 2: NGT.accommodate > IS.accommodate (see Figure 46). Here, the lecturer shared how he can accommodate between NGT and sign-supported Dutch, depending upon the context: accommodate + sign-supported dutch + sign.

The interpreter chose to import the NGT signs accommodate + sign by repeating the accommodate sign twice and adding more pointing: accommodate + Pointing + sign Pointing + accommodate. He explains what accommodate means by specifying where it takes place.

¹¹³. As the common convention in sign language linguistics, we use small caps for loose translation of lexical signs and lower-case text for non-lexical signs.

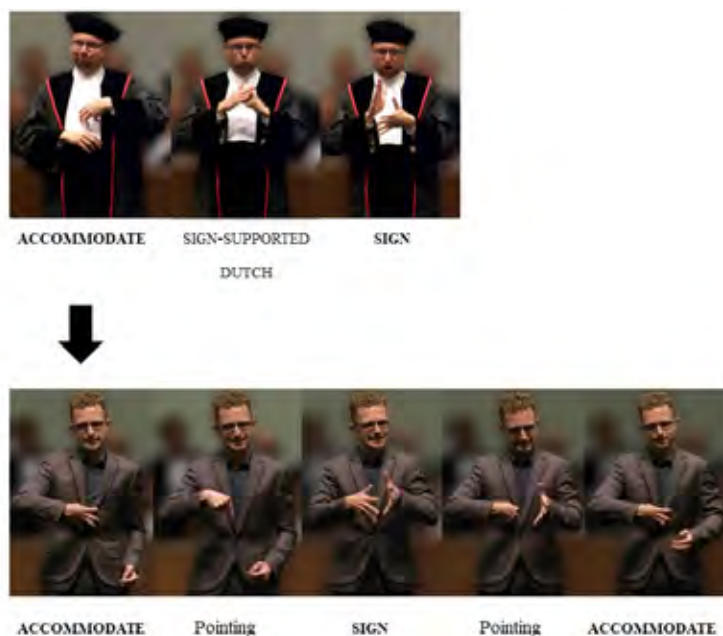


Figure 47. Accommodate from NGT to IS interpreting

This relates to 'reiteration,' as the interpreter reiterates the same sign (Lawrence, 1994). This should not be confused with what Rosenstock (2008) calls 'repetition': namely, 'the repetition of signs in more than one form' (p. 144).

Example 3: NGT. dangerous > IS.dangerous (see Figure 47). Here, the lecturer shared how some hearing people associate sign-supported Dutch with NGT. He mentioned that this confusion can be dangerous for the status of NGT.



Figure 48. Dangerous from NGT to IS interpreting

The interpreter chose to import the NGT sign dangerous repeating it and adding an extra sign devil. The sign devil is iconic and represents the devil's horns. It is like he explains what dangerous means by relating it to a dangerous character everybody knows or has the concept of.

Contextualization

Example 4: NGT.nijmegen > IS.nijmegen (see Figure 48). Here, before the interpreter imported the sign for the city of nijmegen (where the event took place). She chose to relate the sign coming forward to the current space by pointing to the metaphorical present space (this stands for 'here').

McKee and Napier (2002) also observed this strategy when the interpreters were '[...] *making literal reference to real-world location*' (p. 35) from their dataset.



Figure 49. Nijmegen from NGT to IS interpreting

Example 5: NGT.arnhem > IS.arnhem (see Figure 49). Here, the interpreter chose to spatially map (Lawrence, 1994) the city of Arnhem, so that the audience could visualize its location in the Netherlands. This sign for arnhem was used again during the lecture, but then it was imported without any extra strategy because it had already been introduced.

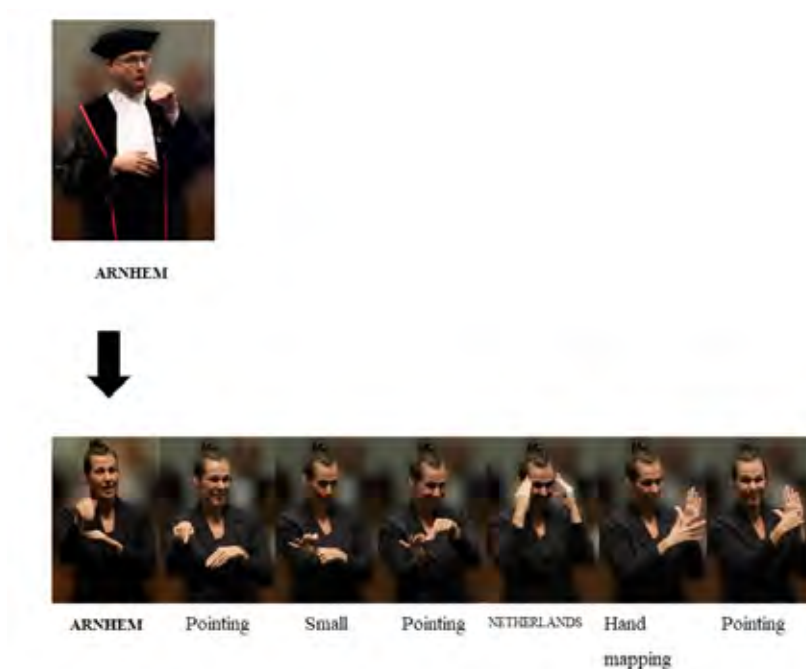


Figure 50. Arnhem from NGT to IS interpreting

Example 6: NGT.strong > IS.strong (see Figure 50). The lecturer shared how he became increasingly fluent (strong) in using NGT. The interpreter chose to import the NGT sign for strong into his IS target output by contextualizing it, saying that 'strong' referred to something deep inside of him. To do this, he used one extra sign: deep inside.



Figure 51. Strong from NGT to IS interpreting

This could relate to the strategy of 'adding detail: judging ellipsis and redundancy' noted by McKee and Napier (2002, p. 45). The interpreter judged that the sign strong was not explicit enough, so he decided to emphasize it by contextualizing its content.

Description

Description means importing an NGT sign with a strategy that depicts the meaning of the source sign.

Example 7: NGT.decrease > IS.decrease (see Figure 51). Here, the lecturer spoke about the decrease in the use of sign languages in many countries. The interpreter chose to import the NGT sign decrease by adding a different form of the sign decrease that showed diminution. Then she added a gesture/facial expression to depict the inadequacy of this situation.



Figure 52. Decrease from NGT to IS interpreting

This is what Rosenstock (2008) refers to as 'repetition': the interpreter repeats the same meaning with a different sign. The gesture (two hands, palms facing upwards) also occurred in the dataset from McKee and Napier (2002), but in the context of a rhetorical question. In our dataset, this gesture served as a comment about the decrease and emphasized its negative impact.

Example 8: NGT.facial expression > IS.facial expression (see Figure 52). Here, the lecturer was still explaining how facial expression is part of NGT. The interpreter chose to import the NGT sign for facial expression by (partly) describing what a facial expression is. For this, he used two extra signs: face and nod.



Figure 53. Facial expression from NGT to IS interpreting

Here again, this relates to the expansion technique of 'couching, or scaffolding' (Lawrence, 1994). The signs face and nod are supposed to form the concept of a facial expression.

Guidance

Guidance is importing an NGT sign with a strategy that aims to guide the audience and support their comprehension. It is a means to structure the discourse differently to assist the audience through it.

Example 9: NGT.show > IS.show (see Figure 53). Here, the lecturer explained how facial expression is part of NGT and was about to display an example (show). He did not point to the future example, but moved to his laptop to display it. The interpreter chose to import the NGT sign for show by once again 'reminding' the audience what this example is about (an example in NGT) and pointing to where it was displayed (the screen). For this, she used two extra signs: sign and Pointing.

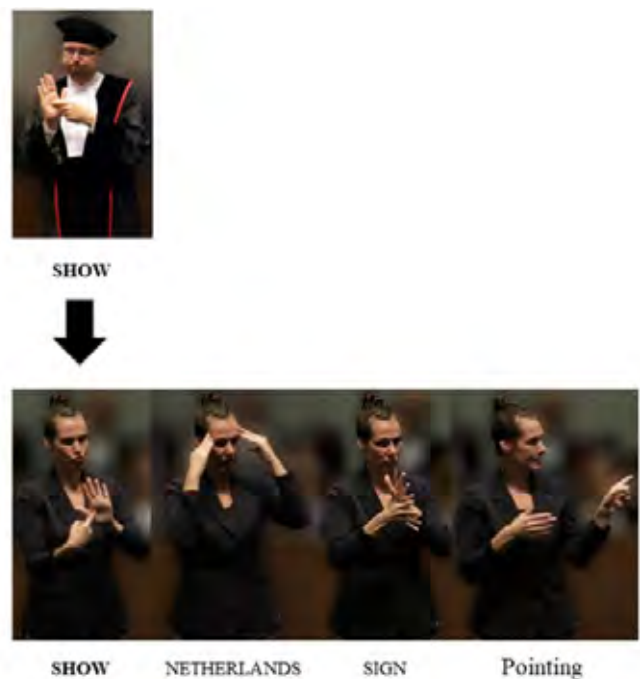


Figure 54. Show from NGT to IS interpreting

Example 10: $NGT.difference > IS.difference$ (see Figure 54). Here, the lecturer was speaking about the different (difference) facial expressions people can use when they ask a question. The interpreter chose to import the NGT sign difference by adding a sign related as an auxiliary verb (have) to accompany the audience by structuring the discourse based on English (or Dutch): *'It has different...'*. The signing structure have + difference is based on the written/spoken structure of English and Dutch. In general, in signed languages like NGT, the sign difference in this context would suffice. In this IS instance, the interpreter chose to emphasize the difference by adding the sign have right before. This structure have difference instead of difference follows the structure of Dutch and English.



Figure 55. Difference from NGT to IS interpreting

This potentially corroborates other findings on the influence of English on IS. McKee and Napier (2002) have observed how lip patterns are based on spoken English. And Whynot (2016) found that IS presentations were reported to be easier to comprehend by viewers from Australia and the USA if English ‘mouthings’ were represented in the text.

Here, we observe another occurrence of English influence on IS interpreting: the use of specific constructions or expressions.

NGT Lexicon Imported without Any Extra Strategies

In total, 81 single signs were imported without any extra strategies. This means that there was no extra sign or any linguistic structure preceding or following the source sign that aimed to describe, explain, or contextualize it, or guide the audience to understand it. We divided these 81 signs into four categories which can explain one of the reasons the interpreters chose to not use additional strategies to import these signs. We have presented the categories separately, but they can overlap.

Terminology

Some terminology terms were imported without any extra strategy. This was the case for the signs that represent specialized terms used by linguists.

Example 11: phonology (see Figure 55)



Figure 56. Phonology from NGT to IS interpreting

Example 12: morphology (see Figure 56)



Figure 57. Morphology from NGT to IS interpreting

Country Names

Many country names were imported without any extra strategy. However, this was not the case for local city names (see Examples 4 and 5). This is not surprising, as many signs for country names originally come from the countries' own signed languages.

After checking with signers of the languages involved and the website spreadthesign.com, we can confirm that this is the case here. The signs for the country names below (Netherlands, Sweden, Australia, and New Zealand) are all borrowed from the countries' own signed languages. For instance, this means that the sign for sweden in Swedish Sign Language is the same in NGT, and so on for Australia and New Zealand.

Example 13: Netherlands (see Figure 57)



Figure 58. Netherlands from NGT to IS interpreting

Example 14: Sweden (see Figure 58)



Figure 59. Sweden from NGT to IS interpreting

Example 15: Australia (see Figure 59)



Figure 60. Australia from NGT to IS interpreting

Example 16: New Zealand (see Figure 60)



Figure 61. New Zealand from NGT to IS interpreting

Signs Representing Timeline

Signs representing time were imported with no added strategy. In many western countries¹¹⁴, the use of space to visualize time is body-anchored in a sagittal axis of the signer. This means that the future is placed in front of the signer and the past is located behind them. Present is close to the signer's body, so generally there is no sign to mention the present tense.

¹¹⁴. See Emmorey, 1996 for American Sign Language; Sutton-Spence & Woll, 1999 for British Sign Language, Engberg-Pedersen, 1993 for Danish Sign Language, and Cuxac, 2000 for French Sign Language.

There is a common thought that time is metaphorically expressed the same among signed languages, but it may actually be different. For instance, in Urúbu-Kaapor Sign Language, a sign language used in Brazil, time is body-anchored, but future is located above the head of the signer as something unknown and out of the control of the man (Ferreira-Brito, 1983).

In IS, the expression of time follows the pattern well-described and observed in many institutional signed languages.

Example 17: past (see Figure 61)



Figure 62. Past from NGT to IS interpreting

Example 18: future (see Figure 62)



Figure 63. Future from NGT to IS interpreting

Signs Common among the Sign Languages Represented in the IS Audience

Of the 81 signs that were imported without any extra strategy, more than 50% overlapped with the signs used in the sign languages represented in the

audience: 73% overlap with VGT, 56% with DGS, and 52% with ASL. The Dutch interpreters could not have done this deliberately because VGT and DGS are not part of their language repertoire (although they may know a few signs from the neighboring languages). However, both Dutch interpreters are fluent in ASL.

By contrast, for the 44 signs imported with extra strategy, we observed that the overlapping with the audience's languages is smaller than for the signs imported without any extra strategy. For instance, we found the overlapping with ASL to be 40%, with DGS to be 52% and with VGT, 59%.

This might support the hypothesis that if a sign is perceived as very Dutch, the interpreter would tend to add extra strategy to import it, if they decide to import it. By contrast, if a sign is perceived as common in many of the sign languages presented in the audience, the interpreter would tend to import it without adding any extra strategy. This remains a hypothesis to be tested, in the sense that we do not know how the actual two interpreters perceived these signs at the moment of observing them in the source. In general, the finding supports the need to know, even superficially, the lexicon of many sign languages when it comes to IS interpreting.

Conclusion and Implementation

This study aimed to offer a new perspective on IS interpreting by focusing on lexical influence in simultaneous interpreting from NGT to IS by a team of two deaf interpreters. IS interpreting is a twofold language contact phenomenon: it brings influences from the source language and from the essence of the target output, namely, IS, which is a mix of sign languages.

The results show that lexical influence from the source NGT language to the target IS output is not an isolated phenomenon. It happens frequently. Indeed, many source NGT signs were found to be imported to the IS target in a 20-minute segment.

Firstly, some of the source NGT signs were imported with extra strategies related to the aim to explain, context, describe, and/or guide. Within those aims, the overarching strategy remained the same: to emphasize (as demonstrated in the previous literature). This can be done by repeating,

reiterating, couching, spatial mapping, locating referent in space, and adding detail. These strategies relate to previous findings on IS interpreting and sign language interpreting in general (Lawrence, 1994; McKee & Napier, 2002; Rosenstock, 2008).

Secondly, some of the source NGT signs that were borrowed without any extra strategy can be divided into different types of signs: terminology, country names, signs representing the timeline, and signs common among the sign languages represented in the target IS audience. This may offer insight into why the two deaf interpreters imported these signs without any extra strategy. Another methodology would be needed to delve deeper into 'why' these decisions were made. However, this pattern of importing signs without any extra strategy offers insight for future IS interpreters about what can be done.

In general, this paper confirms that local signs are an important part of IS output and IS interpreters must be aware of this phenomenon. To deal with this, IS interpreters must know more than one sign language to proficiently interpret IS. This skill gives them the tools to adapt their output for the audience. They will inevitably have to import source local signs and contribute to the implementation of these strategies, so we set up four aim categories. Knowing the aim, namely the 'why' behind each strategy, will give interpreters more awareness of possible choices, and can be used as a pedagogical tool as well.

Finally, this qualitative study opens the way for follow-up studies on practical implications of any given strategy on the interpreting task (*Is the processing time longer?*) or the interpreting result (*Is the interpreting less idiomatic?*). *Can any given strategy be related to a specific reason for using it?* Follow-up interviews with interpreters in studies like these could provide a specific answer. As the dataset for the present study is accessible to other researchers (see Appendix 1), further studies can be conducted on the work of the interpreters.

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Chapter 6

Final discussion and conclusion

"Academia is discussion"

- A colleague

This dissertation arises from the observation that multiple claims on international sign interpreting are mainly based on historic literature and data (Allsop et al., 1995a; R. McKee & Napier, 2002; Rosenstock, 2008; Woll, 1990) and/or personal theorizing (Moody, 1994, 2002, 2008; Oyserman, 2016; Scott Gibson & Ojala, 1994). Of these studies, only a few are empirical and data-based (e.g. Woll, 1990; McKee & Napier, 2002).

Two of the most commonly reported themes about international sign interpreting in comparison to national sign language interpreting, is that it is considered to have an extended processing time (Best et al., 2016; R. McKee & Napier, 2002), and a “limited” and “impoverished” lexicon (Allsop et al., 1995a; R. McKee & Napier, 2002). The lack of a defined core lexicon is one of the main reasons why there is little consensus among researchers and interpreters on what international sign should be called. It is variously referred to as international sign pidgin, international sign with small letters, or International Sign with capital letters, and more recently as International Sign Language (see Hansen, 2016; Rathmann & Müller de Quadros, 2023). These labels imply that IS can either be considered as a fully developed language (e.g. IS language) or a code-mixing practice (e.g. international sign pidgin).

Currently, IS is increasingly being recognized as an umbrella term to describe the translanguaging practices among signers who do not share the same sign language, and it is frequently used as an official conference language in both direct and interpreted communication (Kusters, 2021a). Regarding IS interpreting, the demand for conference interpreters has risen, resulting in a growing need for specialized training and a deeper understanding of the elements that constitute IS (Wit, 2023; Wit & Sluis, 2016).

Thus, the aim of my thesis was to systematically investigate the two main misconceptions about the processing time and use of lexical signs in order to update and revise the current information on IS. To ensure the validity of our findings, it was important to obtain results based on a direct comparison with one national sign language which would serve as a point of reference; a comparison is considered direct if the two interpretations are produced from the same source discourse. Thus, we investigated whether IS interpreting deviates from national sign language interpreting (NGT) and if so, to what extent. The general research question and the guiding principle of this thesis is: *Does interpreting from English to IS stand out as markedly different from interpreting to a national sign language?* More specifically, how does

interpreting from English to IS differ from interpreting from English to NGT? To answer this general question, I unpacked the topics of IS interpreting processing time and IS lexical signs in the following four research questions:

RQ1: How long is the processing time in IS interpreting versus NGT interpreting? (**Chapter 2**)

RQ2: What is the sign type distribution of IS interpreting versus NGT interpreting? (**Chapter 3**)

RQ3: How do lexical diversity and sign frequency compare between interpreting to IS and interpreting to NGT? (**Chapter 4**)

RQ4: How does IS interpreting borrow source NGT lexical signs for use in the IS target output? (**Chapter 5**)

In this chapter, we bring together the main findings of the four studies described in the previous chapters and link them to existing research. Moreover, we expand on the contributions for researchers and for practitioners, discuss limitations, and provide future research directions.

Summary of the main findingsThe first research question (RQ 1) answered in **Chapter 2** was: How long is the processing time in IS vs. NGT interpreting? To answer this question, our research group developed a dataset based on the recordings of a team of two IS interpreters and a team of two NGT interpreters working on three authentic lectures given in spoken English, in 2018. The audience of the IS interpreters consisted of a deaf polyglot signer who had just moved from the UK to the Netherlands at the time of the recording. This deaf participant has ASL as a native language and BSL, Costa Rica Sign Language, Cambodian Sign Language, and some basics of NGT as acquired languages. The interpreters, fluent in ASL but working most commonly with IS, noted trying not to produce a too strong ASL version.

Our hypothesis, based on many interpreters' impressions (including my own while observing IS interpreters at conferences), was that IS interpreting processing time is longer than NGT interpreting processing time. These long IS interpreting processing times are also noted in the literature: from 10 to 16 seconds (McKee and Napier, 2002) for English to IS interpreting, and up to 18 seconds (Best et al., 2016) for IS to English interpreting. This suggests that

IS interpreters more consciously manage their processing time. These findings contrast with processing times mentioned in the literature for other language modalities, e.g., spoken languages, and other sign languages. For instance, Defrancq (2015) found a processing time of 2 - 6 seconds for French to Dutch conference interpreters and Cokely (1986) found an average of 2.8 seconds for ASL interpreters with an upper limit ranging from 6 - 8 seconds. These low values do not come close to those observed by McKee and Napier (2002) and Best et al. (2016).

Processing time is associated with cognitive processing (see Cokely, 1986), i.e., the listening and analyzing effort combined with the memory effort (Gile, 1999; Leeson, 2005). For the two IS interpreters in our study, these high processing time values suggest a more conscious management of their processing time in comparison to the two NGT interpreters.

An issue with previous studies on IS processing times is that the processing time reports are anecdotal, not systematic, and not directly compared to a same modality language. We therefore designed a systematic study, and note that, after Cokely (1986) who systematically investigated ASL interpreting processing time ours, ours is the second of its type about sign language interpreting. Moreover, we are the first to make a direct and systematic comparison between interpreting to IS versus to NGT.

Our results show that the processing time was longer for IS interpreting (2.9 and 2.8 seconds) than NGT interpreting processing time (2.5 and 1.8 seconds), yet the difference was not statistically significant and much smaller than that reported in the literature. Therefore, knowing that IS interpreting processing time does not radically differ from processing time for NGT interpreting leads to the suggestion that IS interpreters (at least sometimes) behave similarly to national sign language interpreters in terms of cognitive load. Yet IS interpreters tend to have a more conscious management of their processing time than NGT interpreters. In summary, our findings neither prove nor disprove the hypothesis about an elongated processing time in IS.

In **Chapter 3**, we designed a study to answer the **second research question (RQ 2)**: What is the sign type distribution of IS interpreting and does it differ from NGT interpreting? To answer this, we recorded a dataset from recordings of a team of two IS interpreters and a team of two NGT interpreters working in parallel from the same two staged lectures delivered in English, in 2019. The

audience consisted of a diverse group of deaf signers, containing subgroups from the Netherlands, Belgium (two sign language areas), and China - a rare opportunity to investigate IS beyond western borders. Following the literature, I investigated the sign type distribution of IS vs. NGT interpreting according to the following sign types: *lexical signs, depicting signs, pointing signs, fingerspelling, enactments, palm-up, numbers*.

As an LSF interpreter watching IS interpreters at work over many years, I have often had the impression that IS was composed of many lexical signs despite the common statement by IS interpreters: "If you want to become an IS interpreter, don't focus on lexical signs, focus on iconicity" (see Moody, 2002). This is about the iconicity present in the grammar of sign language and not the (degree of) iconicity present in lexical signs (Cuxac & Sallandre, 2007). However, Monteillard's (2001) and Whynot's (2016) results on expository IS (i.e., IS lectures) show that the bulk of the sign types were in fact lexical signs. In addition, Whynot (2016) compared her results to national sign language sign type distributions (ASL, BSL and Auslan), yet her comparison was indirect as these datasets were unrelated. As in ASL, BSL and Auslan, lexical sign was the main sign type used in IS expository signing. This suggests that IS does not really downplay the use of lexical signs as reported in the literature (Moody, 2002; McKee & Napier, 2002). Moreover, this gave rise to the idea that there is a gap between what IS is supposed to be and what IS actually is. Only a direct comparison between IS and a national sign language would provide a clear-cut answer about these two seemingly contradictory statements. Thus in the research described in **Chapter 3**, I directly compare IS and NGT interpretations from the same source discourse.

The results provide the first sign type distribution for IS interpreting, and, as a side-effect, the first NGT interpreting sign type distribution. A breakdown of the sign types revealed that IS interpreting is, as thought, composed of a considerable proportion of lexical signs (59.9%), however much less than that of NGT interpreting (80.2%). Therefore, even if some IS interpreters do not recommend focusing on lexical signs when practicing IS, our dataset and results show that the majority of linguistic elements used in IS are *lexicalized*. However, our findings highlight that, in comparison with the national sign language NGT, there is less focus on lexical signs.

In **Chapter 4**, I answered the **third research question (RQ 3)**: What is the *lexical diversity* and *lexical frequency* in IS versus NGT? We used one of the

two staged lectures from the dataset presented in Chapter 3. In this case, we focused on the main sign type: the lexical sign type. Given that lexical signs form the bulk of the composition of IS interpreting, this possibly contradicts the claim that the IS (core) lexicon has been defined as 'limited' (McKee & Napier, 2002, p. 46; Rosenstock, 2007, p. 100) and 'impoverished' (Allsop et al., 1995a, p. 187). We operationalized these terms by exploring whether lexical signs used in IS were equally diverse as those used in NGT interpreting. Moreover, we compared lexical frequency results for IS vs. NGT interpreting, with a particular focus on the top ten lexical signs.

After computing the TTR (Type-Token Ratio), we show lexical diversity for both IS interpreting and NGT interpreting; in other words, the number of different lexical signs used (types) over the number of all the lexical signs used (tokens). Our results reveal that IS lexical signs are a little less diverse than those of NGT, i.e., the number of IS lexical signs is smaller and, reiteration occurs more often than in NGT lexical signs. However, the TTR difference between IS and NGT interpreting is minimal and not statistically significant.

For lexical sign frequency, our results show that the difference between the number of lexical signs used only once by IS and NGT interpreters is small. We noted a few points of difference between the percentages of hapax legomena (also known as singletons). However, our initial qualitative analysis of the production of the lexical signs suggested that IS interpreters make greater use of the underlying iconicity present in the lexical signs, while this is not the case for NGT interpreters.

Finally, given that IS interpreting draws from national sign language lexical signs, it is important to unpack features of their use. In **Chapter 5**, I addressed the **fourth and last research question (RQ 4)**: "How do IS interpreters loan source NGT lexical signs in their target IS interpreting? To answer this, our research group recorded a team of two deaf IS interpreters working from an authentic lecture delivered in NGT in 2018. The IS interpreters' audience consisted of deaf signers with the native sign languages ASL, DGS, and VGT. To analyze the data, we first established whether an *influence phenomenon* – and not *interference phenomenon* as that carries a negative connotation (Pöchhacker, 1994a) – occurred. Influence is the mark of the source language (here NGT) into the target output, in this case, IS interpreting. We primarily observed influence at the lexical level.

The results show that the IS output borrowed from the source NGT lexical signs. We observed 143 NGT lexical signs in the source that were used by the two deaf interpreters in their target IS interpreting; some were lexical signs with the same meaning in ASL, DGS, and VGT, and some were less directly recognizable. In a second step, we observed that 62 of the 143 (43%) NGT lexical signs were borrowed in the target utterances by using specific strategies, and 81 (57%) without any specific strategy.

For the first group (borrowed with strategies), we then analyzed the strategies following those mentioned in the literature (McKee & Napier, 2002; Lawrence, 1994; Rosenstock, 2008). We clustered these different strategies into larger categories, revealing the "aim" of their 'hosted' strategies. Thus, when the IS target output borrowed source NGT lexical signs, we hypothesized that interpreters used strategies providing explanation, contextualization, description, or guidance.

For those lexical signs in the latter group (no specific strategies), we set out to find any common features. This led to a classification in three categories: technical terminology terms, country names, and signs related to a timeline. In addition, 52% - 73% were common among the sign languages represented in the IS audience, i.e., shared between NGT and ASL, DGS, and VGT.

General discussion Our findings are based on relatively small datasets, however they give a clearer picture of what was known on IS interpreting in 2018, when this research project started. Each of the small-scale studies provide clear evidence that IS interpreting differs to some extent from NGT interpreting. Regarding processing time, lexical diversity and lexical frequency, we found that IS does not radically deviate from NGT, however for sign type distribution, we report a more substantial difference.

The implications of these new findings are discussed in the following sections in terms of (2.1) our conceptualization of IS as a language and (2.2) national sign language interpreters.

Should IS be considered to be a language?

Since starting this thesis, I intentionally decided to pick and use the term 'international sign' as opposed to the term 'international sign language' to be in line with the majority of the literature and to ensure that this research project was outside the 'language or not' debate. As mentioned by Hansen (2016) and

Kusters (2024), IS have been labelled with multiple terms. With my findings, it is time to shed further light on this everlasting debate: Is international sign a language or not? Taken together, the findings of this study can be interpreted as moving a step towards the broader view of international sign *language*, as clearly articulated by Rathmann and Müller de Quadros (2023).

Not only have researchers argued that the lexicon in IS is unstable and varied, but also that the proportion of lexical signs is strongly reduced with respect to national sign languages (see Hiddinga & Crasborn, 2011; Rosenstock, 2004; Supalla & Webb, 1995). Yet, having a shared pool of lexical signs is essential for mutual understanding, as it ensures that all interlocutors can consistently interpret and convey specific meaning. Lexical signs, which are arbitrary in the sense of their fixed relationship between form and meaning, must be learned and consistently understood across various communication contexts, however iconic the signs may be. This stability in meaning across different settings is crucial for effective communication (Sandler & Lillo-Martin, 2006). Without a stable and shared lexicon, even a well-structured system of grammar cannot function as a fully operational language. Thus, the absence of a robust and commonly understood lexicon in IS has always challenged its classification as a language (Hansen, 2016).

Our findings suggest that this challenge should be reevaluated. In our datasets, interpreters try to avoid the use of lexicon and focus on using non-lexical grammatical and other constructions. However, we found a similar proportion of lexical vs. non-lexical signs as in national sign languages. That makes the IS we observed more language-like than we had expected.

My results have shown that the manual part of IS used by deaf and hearing interpreters contains either a majority (**Chapter 3**) or substantial amount (**Chapter 5**) of lexical signs. In that sense, IS in this dissertation exhibits more language-like features than previously noted. The proportion of lexical signs in relation to other types of manual realizations is similar to that found in corpus-based studies on national sign languages like Auslan and BSL, at around 60%. From that perspective, it is the NGT interpreters in **Chapter 3** that are notable ($\pm 80\%$ lexical items), not the IS interpreters. However, as a corpus study for NGT was not part of this study, we were unable to shed light on the high proportion of lexical signs found for NGT interpreters. The NGT Corpus is readily available for this purpose (Crasborn et al., 2008; Crasborn & Zwitserlood, 2008).

We were unable to find a difference in the diversity of lexical signs between interpreting to NGT versus interpreting to IS; the difference is not statistically significant. Thus, in our data there is no indication that we should qualify the IS lexicon as either 'limited' or 'impoverished'. In our dataset, the lexical diversity of IS and NGT behave similarly, showing as for processing time, that IS displays a language-like pattern.

Our observations of this language-like pattern at a lexical level, however, does not imply that we can define an IS (core) lexicon, which is relevant when labelling IS as language. On the one hand, Rathmann and Müller de Quadros (2023) propose labeling international sign as a language despite recognizing the high variation within IS lexical signs. The authors consider a high degree of variation to be part of any given spoken and signed language. Yet, their findings are based on IS deaf user interviews and their ideologies on IS. In contrast, Whynot (2016) was able to establish a small yet recurrent IS lexicon used across settings in her datasets of IS deaf users signing, and Whynot uses the label international sign.

Our results warrant classifying IS as a language, or at least they form an important step towards making this classification. Spoken and national signed languages have a long-standing history of extensive research, often involving hundreds of thousands of word tokens in their corpora, if not millions. In contrast, this thesis, along with all other earlier studies on IS, is based on a more limited dataset, spanning only a few years, a few language users, and including thousands of sign items. This limitation must be considered before classifying IS as a language (see also section 6.3 below).

Thus, the debate surrounding the classification of IS as a language clearly merits further research on a broader scale. Hopefully, both the data and the methodologies of this thesis, especially in chapters 3 and 4, will serve as an inspiration for such future research. This "language-or-not" question needs further consideration due to its broad implications affecting both linguists and conference interpreters. Currently, deaf interpreters cannot apply for AIIC membership with IS as a working language as IS is not officially recognized as a language by AIIC. This creates challenges for deaf interpreters who primarily work between a national sign language and IS, rather than between two national sign languages (Wit, 2023).

Broader linguistic and cognitive perspectives on IS interpreting

Beyond the question of whether IS qualifies as a language, this dissertation contributes to broader discussions on linguistic and cognitive aspects of interpreting. The findings align with Gile's (1999) Effort Model, demonstrating how IS interpreters manage cognitive load similarly to spoken language and national sign language interpreters, despite differences in linguistic resources (**Chapter 2**). Additionally, the reliance on iconicity and non-lexical strategies in IS interpreting resonates with broader research on multimodal communication, particularly the role of iconicity in enhancing the will to be understood and cognitive processing (Perniss et al., 2010; Taub, 2001); **Chapter 3 and 4**. Furthermore, this work extends the literature on multilingualism and translanguaging practices (Kusters, 2021) highlighting IS's unique position as a bridge between diverse linguistic communities (**Chapter 5**). By integrating these findings with studies on lexical diversity and frequency (Börstell et al., 2016; Fenlon et al., 2014; Johnston, 2012), this dissertation underscores the adaptability of IS interpreters and their innovative use of linguistic resources confirming yet nuancing previous results and observations with more recent and bigger datasets (McKee & Napier, 2002; Moody, 2002; Rosenstock, 2008; Whynot, 2016). IS has evolved and does not stand out of national signed languages as it used to be. These insights emphasize IS interpreting not merely as a practical tool but as a dynamic system that informs both linguistic theory and professional interpreting practice.

What can IS interpreters learn from this study?

IS interpreters highlight the need for specialized training, as most have added IS interpreting to their national sign language skills (Wit, 2023). Our research findings contribute to their professional development and inform policy-making relevant to their daily work.

In general, our direct comparison between interpreting to IS *and* NGT reveals that IS does not radically deviate from NGT. **Chapter 2** nuances the strong claims in the literature on lengthy processing times for English to IS interpreting. The fact that IS processing time is close to that of NGT for the specific interpreters and situation we studied suggests that the cognitive process is similar between IS and NGT. This is challenging, as NGT is a full-fledged language and IS is not considered as such. This study provides a start for linguists and policy makers towards considering IS interpreting as being equal to national sign language interpreting and, in another discussion, an argument for considering IS as a full language.

In **Chapter 3**, our results are striking in the sense that our analysis of the sign type distribution of IS versus NGT interpreting shows that IS interpreters use a majority of lexical signs to render information, albeit to a lesser degree than NGT interpreting (59.9% versus 80.2%). **Chapter 3** shows that lexical signs in IS are not infrequent occurrences. Linguists can build on these results and evaluate the comprehension, iconicity, and the origin of these lexical signs by deaf users of diverse national sign languages.

Then, **Chapter 4** adds evidence for some linguists' impression that IS does not differ greatly from a national sign language like NGT in terms of lexical diversity. In addition, our results provide a list of the most frequent lexical signs used in IS and NGT. These can not only be used by linguists to further research on lexical frequency and its relationship to sign reduction, but also by IS learners to acquire a set of the most frequent lexical signs used in IS. Moreover, we show that if a lexical sign is similar to IS and NGT, IS interpreters will try to *de-lexicalize* the lexical sign, maximizing iconicity (Johnston & Ferrara, 2012; Johnston & Schembri, 1999). For instance, see Figure 36 for stressing the iconicity roots of the lexical sign animal and Figure 37 for greater involvement of the IS interpreter's body for the lexical sign disappear. In **Chapter 4**, we also give instances where lexical signs are located in a virtual map (see Figure 25 for Asia, America, Africa) and different ways to use the pointing signs and the lexical signs see and oh to render information in IS.

Finally, our findings on source sign borrowings on sign to sign interpreting presented in **Chapter 5** add practical tools to the toolbox of current and future IS interpreters. The specific strategies we discovered for borrowing lexical signs from the source language (explanation, contextualization, description, and guidance; see examples 1 to 10) could be taught to and practiced by all IS interpreters. Furthermore, our findings suggest that IS interpreters can produce lexical signs for terminology, country names, and timelines with a high chance that these lexical signs are common to the audience's sign languages (see examples 11 to 18). Finally, our study confirms that IS interpreters benefit from knowing more than one sign language (see Moody, 2002 and the IS interpreter accreditation WFD/WASLI handbook ¹¹⁵). This should definitely be considered when developing an IS interpreting curriculum. Of note, in April 2024, one Master program opened in Sienna, Italy, teaching national sign language interpreters to work in a multilingual setting including

¹¹⁵. <https://wfdeaf.org/our-work/wfd-wasli-international-sign-interpreter-accreditation/>, visited 26 August 2024.

IS; the Multilingual Sign Language Translation and Interpreting Studies (MITS) Master.¹¹⁶

What can national sign language interpreters learn from IS interpreting?

This section echoes the question asked by McKee and Napier (2002) at the very end of their study. While IS interpreters bring their national sign language interpreting skills into their IS interpreting practice, they develop new skills that could also feed into their national sign language interpreting practice. Our findings confirm and complement the recommendations given by McKee and Napier (2002).

The first of these is to manage processing time more efficiently and avoid rushing the output, which can lead to false starts. In **Chapter 2**, we show that IS interpreters tend to have a more conscious management of their processing time than NGT interpreters. This allows them to avoid false starts as observed informally in many instances in our data for NGT interpreters.

The second recommendation would be for NGT interpreters – as NGT was the language compared to IS – and to some extent, for national sign language interpreters (assuming many signed languages have a lot in common). National sign language interpreters could think twice before using a lexical sign when a non-lexical alternative is available and would be more visual. By force of circumstance (i.e., no core lexicon defined), IS interpreters have to find alternatives to lexical signs, yet this constraint possibly brings creativity and a freer interpretation (e.g., one word may correspond to a chain of signs), in contrast to literal interpreting. This creativity can be brought into national sign language interpreting even where the constraint on the use of lexical signs is less strong. Lexical signs are part of signed languages just as words are part of spoken languages. Yet, signed languages have the particularity to be able to use iconicity more, exploiting the possibilities of their visual-gestural modality. Vermeerbergen (2006) uses the metaphor of 'sparkling' and 'still' water to distinguish between two types of sign language production: lexical and non-lexical. She characterizes 'sparkling water' as sign language production that fully exploits the unique potential of the gestural-visual modality, maximizing the use of space, simultaneity, and visual imagery. In contrast, 'still water' describes sign language production that relies more heavily on lexical signs

¹¹⁶. <https://www.mpdfonlus.com/it/Le-attivita%20Multilingual-Sign-Language-Translation-%26-Interpreting-Studies-%28ENG%29-810/>, visited 6 May 2024.

that more closely resemble the structures found in spoken languages. While Vermeerbergen (2006) stresses that this water metaphor does not entail any value judgment, some scholars argue that eloquent sign language use occurs when iconicity is prevalent (see Sallandre & Cuxac, 2002; Wilcox, 2004).

Furthermore, recent research on second language acquisition highlights differences between L1 and L2 signers in their use of non-lexical productions, i.e., depicting signs, with L2 signers often demonstrating less proficiency in this area (Schönström & Mesch, 2022). Acquiring non-lexical productions in sign language is not as smooth a process as acquiring lexical production as it requires more work and intentionality; the same may be true for sign language interpreters. Therefore, while acknowledging the importance and value of lexical signs (which also possess iconic qualities), national sign language interpreters should carefully consider opting for a depicting sign when it offers a more visually effective alternative. This approach can help create more eloquent interpretations that are closer to the productions of L1 signers.

Overall, when comparing IS and NGT interpreters in our datasets, I informally observed a greater involvement of the body and a greater use of the space. As presented in **Chapter 4**, the form of the lexical sign in IS and NGT is sometimes the same, but while the NGT interpreter will produce the lexical sign in a more neutral manner, the IS interpreter will try to involve their whole body to reactivate the iconic roots of the lexical sign. This was evident in the use of the lexical sign *animal*, for instance (see Figure 36 in **Chapter 4**). In addition, concerning the use of space, I observed that IS interpreters occasionally add another layer of iconicity by localizing some lexical signs in space. This was evident for the lexical signs *africa*, *asia*, for instance, which were located in a virtual space representing the WEST/right side and the EAST/left side (see Figure 33 in **Chapter 4**).

The majority of IS interpreters bring into IS interpreting the interpreting skills they learned in national sign language interpreting programs (see de Wit et al. 2021, for details concerning IS interpreter training). These skills – new or present – give them the opportunity to exploit often-used non-lexical resources to a lesser degree in their national sign language interpreting practice.

Limitations and future directions

The six IS interpreters studied in this thesis were found to be more like national sign language interpreters (for different reasons) than we expected

from the literature on IS interpreting, even though some clear differences were observable. However, this conclusion must be limited to the specific contexts that we recorded, namely English to IS conference interpreting in the Netherlands, between 2018 and 2019 by a small pool of deaf and hearing interpreters with different language backgrounds.

In contrast to using more varied datasets to complement our findings, it would also be possible to use the same datasets and explore other aspects further that we could not address. An added value of our research is that all the datasets and annotation files are available in open-access on request (see Appendix 1 – Overview of the different datasets of this dissertation). In this section, I highlight six limitations, each of which suggests a possible avenue for future research.

Investigating IS conference interpreters in political settings

We studied a small number of interpreters interpreting lectures on scientific content, both for academic and lay audiences. IS is used in many different contexts by many different people (see for instance Friedner & Kusters (2015)) and it is likely that different interpreters with different language repertoires who interpret in different contexts will also make different vocabulary choices, using lexical signs from their own and the audience's language repertoires. Accordingly, in order to be able to generalize these findings, research is needed to assess whether our insights also hold for other IS interpreters working in other settings. One particular context of interest is IS conference interpreters working in political arenas, such as UN meetings, EU parliament meetings, etc. (see de Wit, 2024). Moreover, De Wit et al. (2021) mention that IS is likely to become more conventionalized due to the recent proliferation of interpreted events and of web-streaming at these institutions.

What about comprehension of the IS interpreters?

While I have presented IS interpreting strategies and features, an unanswered question is whether these strategies are beneficial for the IS audience. Previous studies have already pointed to limitations in the comprehension of IS: Whynot (2016) found that diverse sign language users understood expository IS with an average comprehension rate of 56%, primarily grasping global discourse-level information, while often misperceiving or attempting to infer specific details based on their own experience, imagination, or contextual guessing. Similarly, Rosenstock (2008) observed that certain distinctions in IS – such as between the personal generic and a personal pronoun – may not

always be clear to viewers, suggesting a need for further research into how IS interpreted data is understood.

In my dissertation, I did not assess the comprehension of the IS target output by the deaf audience. Yet, Whynot and Crasborn (*in preparation*) have undertaken a study on the global comprehension of NGT versus IS by the deaf audiences present in the recordings for the datasets in **Chapters 3 and 4**. Their findings show that IS deaf participants have a lower comprehension than NGT deaf participants. Moreover, a more detailed analysis shows different degrees of comprehension within the IS deaf audience; NGT and LSFB deaf audiences have a better understanding of the IS output than the CSL deaf audience. These results are consistent with the fact that IS, despite incorporating elements from a variety of national sign languages, is primarily influenced by Western sign languages, particularly ASL and European sign languages (see Madsen (1976) for the genesis of IS and the Gestuno dictionary). This Western-centric influence creates challenges for signers from non-Western backgrounds.

Finally, in line with Debevc et al. (2015), Wehrmeyer (2013) and Xiao et al. (2015) who investigated sign language comprehension in different national sign languages, further studies are needed to investigate IS interpretation comprehension. In particular, it would be valuable to investigate the correlation between any given strategy (e.g. explanation, contextualization for **Chapter 5**; e.g. stressing the iconicity roots for **Chapter 4**, etc.) and the degree of understanding by a multi-lingual deaf audience.

The origins of lexical signs used by IS interpreters

In **Chapters 4 and 5**, I touch on the origins of the lexical signs used by the IS interpreters in order to investigate whether these lexical signs overlapped with the IS audience's national sign languages. In 2016, Whynot conducted an depth investigation of the origins of the lexical signs according to her own language repertoire: ASL, BSL, and Auslan. A next step would be to investigate the origins of the lexical signs used in **Chapters 4 and 5** by comparing them to the language repertoires of the interpreters producing the signs and those of the IS audience. In addition, these lexical signs could be assessed by signers from different countries (including non-WEIRD countries)¹¹⁷ to evaluate their degree of universality. A lexical sign may occur in Chinese or Flemish Sign Language, but if these languages are not part of the interpreters' language repertoire, how likely is it that the source of the use of that lexical sign in

¹¹⁷. Western Educated Industrialized Rich Democratic (Henrich, Heine & Norenzayan, 2010).

IS output stems from those languages? In a larger study setting, we could investigate whether ASL is predominant in IS (see Kusters, 2020) and to what degree other national sign languages occur in IS output.

Exploring the ‘black box’ of the interpreters

In **Chapter 5**, I described the strategies used by the interpreters but did not explain the reasons for the use of certain strategies. It would be interesting to investigate whether interpreters used these strategies consciously and, if so, why they chose this strategy over another. Having access to the ‘why’ of the interpreters hidden in their ‘boxes’, i.e., in their minds, could be done via a ‘think-aloud protocol’ (TAP; see Kussmaul & Tirkkonen-Condit, 1995; Li, 2004). A TAP is a protocol where IS interpreters explain and describe their decisions retrospectively, for instance when looking back at a recording of their work shortly after an assignment. This protocol could provide further insights into the choices made by the interpreters.

Continuing to explore the open-access datasets

McKee and Napier (2002) and Rosenstock (2008) presented a set of strategies used in English to IS interpreting. Some of the features have been discussed and assessed in this thesis: extended lag time in **Chapter 2**; making abstract concrete, adding detail, highlighting salient information, strategic explanation in **Chapter 5**; and repetition and use of token space in **Chapter 4**. However, other features could be evaluated in the future: reduced lexical density, extended final hold/extended pausing, selective reduction to manage time and lexicon, restricting and genericizing lexical meaning (McKee & Napier, 2002) and other features based on a lexical and syntactical levels (Rosenstock, 2008). Table 30 shows how future research could be undertaken and the use of the relevant open-access datasets.

Finally, concerning interpreting between IS and a national sign language, here NGT, our findings in **Chapter 5** contribute to what is only a handful of studies in this genre. This study adds to research by Stone and Russell (2016) who compared the use of depicting signs between deaf and hearing interpreters, where the deaf interpreters were working from other national sign languages, namely ASL and BSL. **Chapter 5**’s dataset could facilitate a comparative study with Stone and Russell’s dataset. Our explicit descriptions of transcription and annotation in the empirical chapters could facilitate these studies.

Table 30. Strategies used in English to IS interpreting to be explored using this study's open-access datasets and annotation files

Strategies	Publications	To be explored based on the open-access dataset
Reduced lexical density	McKee and Napier (2002) Rosenstock (2008)	Chapters 3 and 4 explored lexical diversity, yet, adding an extra annotation layer for the speaker would enable studies on lexical density (i.e., ratio of spoken words and signs).
Extended final hold Extended pausing	McKee and Napier (2002)	Can be explored using the Chapters 2, 3, 4 and 5 datasets , but annotation is needed as we did not annotate buoys.
Selective reduction to manage time and lexicon	McKee and Napier (2002) Rosenstock (2008)	Can be explored using the Chapter 2 datasets and annotation files.
Restricting and genericizing lexical meaning	McKee and Napier (2002) Rosenstock (2008)	Can be explored using the Chapters 3 and 4 datasets and annotation files.
On a lexical level: • Substitution • Reduction • Expansion	Rosenstock (2008)	Can be explored using the Chapters 2, 3, 4 and 5 datasets. Informally observed.
On a syntactic level: • Reduction of fixed phrases • Rhetorical questions • Classifiers • Simplification of complex phrase structure • Discourse-pragmatic level • Omission • Addition of a list • Use of surrogate space	Rosenstock (2008)	Can be explored using the datasets created for Chapters 2, 3, 4 and 5 .

NGT interpreting studies

The focus of my research was on IS interpreting, with NGT interpreters being recorded to provide a direct comparison to a national sign language. Yet, as a side effect, NGT interpreter datasets are also available for in-depth research. We recorded five active and back-up NGT interpreters and the audience. Researchers could explore the role of a back-up interpreter versus an active interpreter in a feeding interpreting situation, as well as other aspects of national sign language interpreting related to working with a third language (in this case, English as opposed to Dutch).

General Conclusion

In this thesis, I have deconstructed, nuanced and shed new light on common knowledge, common intuitions, and possibly common misconceptions about features of IS interpreting. There is very little knowledge in this field based on empirical research of interpreters at work. Our findings contribute to the emerging understanding of IS interpreting through its cognitive effort (see **Chapter 2** on processing time) and its use of lexical signs (see **Chapters 3, 4 and 5**). This in turn can help expand our view on the nature of international sign in all its forms, including the open question of how ‘language-like’ international sign use is. Our findings suggest, at the very least, that IS is more language-like than many researchers who have likened IS to a jargon or pidgin. We further hope that the availability of the datasets used in this thesis for other researchers will form a positive impetus to the field.

These findings should not be seen as prescriptivism but as tools for researchers to undertake further research on IS interpreting and IS in general based on quantitative results, which are rare in the field of sign language interpreting, combined with qualitative observations. These tools will help IS and national sign language interpreters to develop their interpreting skills based on qualitative results, given the fact that they all have a Western language background.

The direct comparison between IS interpreting and NGT interpreting in this thesis serves as a model for future studies, as the interpreting field is still in dire need of a better understanding of what IS interpreters can and cannot do in working for multilingual audiences.

And, to finish: Does interpreting from English to IS stand out as being markedly different from interpreting to a national sign language? Here, I give a typical interpreter’s response: it depends!

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Appendices

Appendix 1 - List of datasets and access

	Dataset 1 (for Chapter 2)	Dataset 2 (for Chapter 5)	Dataset 3 (for Chapters 3 and 4)
Type	Video recording of (hearing) IS and NGT interpreters	Video recording of (deaf) IS interpreters	Video recording of (hearing) IS and NGT interpreters
URL of the videos and Elan's files	https://surfdrive.surf.nl/files/index.php/f/15821655200 Password= 2024PHDAurelia#@ <i>For the exclusive use of the reading committee, the datasets are archived in Surfdrive.</i>		

Appendix 2, 3, 4 and 5

URL of the Appendices 2, 3, 4 and 5	- Inaugural lecture: Aurélia Nana Gassa Gonga, Lori Whynot, and Maya de Wit (2018). Item "<i>VICI Interpreting: Inaugural Lecture</i>" in collection "VICI Crasborn: international sign and cross-signing". The Language Archive. https://hdl.handle.net/1839/525191fe-1ea4-4d74-b0a1-e58f45e156b8(link is external). (Accessed 2025-07-16) - Staged Lecture 1: Onno Crasborn, Aurélia Nana Gassa Gonga, Lori Whynot, Maya de Wit, Carl Börstell, and Tashi Bradford (2019). Item "<i>VICI Interpreting: Lecture 1</i>" in collection "VICI Crasborn: international sign and cross-signing". The Language Archive. https://hdl.handle.net/1839/51a7681b-587d-4692-af8e-b46f418f2970(link is external). (Accessed 2025-07-16) - Staged Lecture 2: Onno Crasborn, Aurélia Nana Gassa Gonga, Lori Whynot, Maya de Wit, Carl Börstell, and Tashi Bradford (2019). Item "<i>VICI Interpreting: Lecture 2</i>" in collection "VICI Crasborn: international sign and cross-signing". The Language Archive. https://hdl.handle.net/1839/a5b477c6-5f36-447b-86fe-a13e07a8ba64(link is external). (Accessed 2025-07-16)
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Miscellaneous

Data Management and transparency

The data collected for this dissertation will be archived online in The Language Archive and the Radboud Repository. The data management plan (DMP) for archiving was approved by Radboud University on 1 June 2022. During the research process, the data collection and handling was covered by the collective project Data Management Plan for Deaf Communication without a Shared Language; research funder NWO.

	Dataset 1 (for Chapter 2)	Dataset 2 (for Chapter 5)	Dataset 3 (for Chapters 3 and 4)
Type	Video recording of (hearing) IS and NGT interpreters	Video recording of (deaf) IS interpreters	Video recording of (hearing) IS and NGT interpreters
Date	May 22, 2018	October 12, 2018	May 1, 2019
Description	Hearing IS and NGT interpreters working from spoken English during three 30-minute lectures	Deaf IS interpreters working from NGT during a 1-hour lecture	Hearing IS and NGT interpreters working from spoken English during two 1-hour lectures
Access	Consent has not been given for availability to other researchers	Consent has been given for RU-researchers and non-RU researcher	Mixed: Consent has been given for RU-researchers and non-RU researcher by the IS interpreters and Consent has been given for RU-researchers by non-RU researchers.
URL of the videos and Elan's files	- Inaugural lecture - Staged Lecture 1 - Staged Lecture 2		
Preservation time	10 years	10 years	10 years

English summary

This dissertation investigates international sign (IS) interpreting, comparing it with national sign language interpreting to address misconceptions about IS's processing time and lexicon. IS, used as a *lingua franca* among deaf individuals globally, is often described as having an extended interpreting processing time and a limited, impoverished lexicon. These claims, based largely on anecdotal evidence, are revisited through direct comparisons of interpreting in conference settings to IS and to Sign Language of the Netherlands (NGT). The dissertation concludes that IS interpreting is not fundamentally different from national sign language interpreting in these regards. The results demonstrate language-like features, including reliance on lexical signs and creative use of iconicity, supporting its growing recognition as a linguistic system. These findings thus contribute to debates on IS's linguistic status, its evolving role in multilingual communication, and they lead to practical recommendations for interpreters, emphasizing flexibility and adaptation in multilingual settings.



Dutch summary

Dit proefschrift gaat over tolken naar *international sign* (Internationale Gebaren, IS), en vergelijkt dit met tolken naar nationale gebarentalen om enkele hardnekkige misvattingen over het 'achterblijven' (processing time) en het lexicon van IS te herzien. International Sign, gebruikt als *lingua franca* door dove mensen wereldwijd, wordt vaak omschreven als een communicatiesysteem met een lange verwerkingstijd en een beperkt of verarmd lexicon. Deze aannames, die grotendeels gebaseerd zijn op anekdotisch bewijs, worden in dit onderzoek opnieuw tegen het licht gehouden aan de hand van directe vergelijkingen tussen IS en de Nederlandse Gebarentaal (NGT). Het onderzoek heeft enkel naar congres tolken gekeken.

De conclusie uit het onderzoek is dat tolken naar IS niet fundamenteel verschilt van tolken naar een nationale gebarentaal. De resultaten tonen aan dat IS kenmerken van een echte taal vertoont, zoals het frequente gebruik van lexicale gebaren en het creatief inzetten van iconiciteit. Dit kan de groeiende erkenning van IS als taalsysteem ondersteunen.

Deze bevindingen leveren een bijdrage aan het debat over de taalkundige status van IS, de veranderende rol ervan in meertalige communicatie, en ze leiden tot praktische aanbevelingen voor tolken. Flexibiliteit en aanpassingsvermogen in meertalige contexten staan hierbij centraal.

French summary

Cette thèse porte sur l'interprétation en signes internationaux (SI), en la comparant à l'interprétation en langue des signes nationale afin de remettre en question certaines idées reçues concernant le temps de décalage et le lexique des SI. Utilisés comme *lingua franca* par les personnes sourdes à travers le monde, les SI sont souvent décrits comme ayant un temps de décalage allongé en interprétation et un lexique limité, voire appauvri. Ces affirmations, fondées en grande partie sur des données anecdotiques, sont réévaluées ici à travers des comparaisons directes entre les SI et la langue des signes néerlandaise (NGT) dans des contextes de conférences.

La thèse conclut que l'interprétation en SI ne diffère pas fondamentalement de celle en langue des signes nationale. Elle met en évidence des caractéristiques linguistiques, telles qu'un recours important aux signes lexicaux et une utilisation créative de l'iconicité, qui soutiennent la reconnaissance croissante des SI en tant que système linguistique.

Ces résultats alimentent les débats sur le statut linguistique des SI, leur rôle évolutif dans la communication multilingue, et offrent des recommandations pratiques à destination des interprètes, en soulignant l'importance de la flexibilité et de l'adaptation dans les contextes plurilingues.



Publications

Nana Gassa Gongga, A., Crasborn, O., & Ormel, E. (2024). Interference: a case study of lexical borrowings in international sign interpreting. *International Journal of Multilingualism*, 21(1), 169-188.

Gonga, A. N. G., Crasborn, O., Börstell, C., & Ormel, E. (2020). Comparing IS and NGT Interpreting Processing Time: A case study. *Honouring the Past, Treasuring the Present, Shaping the Future*, 74.

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Nana Gassa Gongga, A. (2019). Traduire en langue des signes française: un acte militant?. *Traduire. Revue française de la traduction*, (240), 59-68.

Nana Gassa Gongga, A. (2019). Interpréter en signes internationaux: état des lieux en France et à l'international. *La main de Thôt. Théories, enjeux et pratiques de la traduction et de l'interprétation*, (7).

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Curriculum Vitae

Aurélia Nana Gassa Gongu is a French Sign Language (LSF) interpreter with over a decade of professional experience. She holds a degree in Sign Language Interpretation from Paris 8 University and she has successfully defended her PhD at Radboud University in 2025 investigating international sign interpreting. Aurélia is the creator and editor of *The 20-20*, the sign language interpreting newsletter that brings research to practice.

Aurélia has won multiple prizes for science valorization, recognizing her efforts to make academic research accessible and impactful. She has also presented her work at prestigious conferences, including the European Forum of Sign Language Interpreters (efsl) and the World Association of Sign Language Interpreters (WASLI). Through her work and contributions, Aurélia is dedicated to advancing the profession, fostering collaboration, and promoting excellence in signed language interpretation.



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