

V. Communication in the visual modality

23. Manual communication systems: evolution and variation

1. Introduction
2. The origin of sign languages
3. Sign language types and sign language typology
4. Tactile sign languages
5. Secondary sign languages
6. Conclusion
7. Literature

Abstract

This chapter addresses issues in the evolution and typology of manual communication systems. From a language evolution point of view, sign languages are interesting because it has been suggested that oral language may have evolved from gestural (proto)language. As far as typology is concerned, two issues will be addressed. On the one hand, different types of manual communication systems, ranging from simple gestural codes to complex natural sign languages, will be introduced. The use and structure of two types of systems – tactile sign languages and secondary sign languages – will be explored in more detail. On the other hand, an effort will be made to situate natural sign languages within typological classifications originally proposed for spoken languages. This approach will allow us to uncover interesting inter-modal and intra-modal typological differences and similarities.

1. Introduction

Throughout this handbook, when authors speak of ‘sign language’, they usually refer to fully-fledged natural languages with complex grammatical structures which are the major means of communication of many (but not all) prelingually deaf people. In the present chapter, however, ‘sign language’ is sometimes understood more broadly and also covers manual communication systems that do not display all of the features usually attributed to natural languages (such as, for example, context-independence and duality of patterning). In addition, however, labels such as ‘gestural code’ or ‘sign system’ will also be used in order to make a qualitative distinction between different types of systems.

This chapter addresses issues in the emergence and typology of manual communication systems, including but not limited to natural sign languages. The central theme connecting the sections is the question of how such systems evolve, as general means

of communication but also in more specialized contexts, and how the various systems differ from each other with respect to expressivity and complexity. The focus will be on systems that are the primary means of communication in a certain context – no matter how limited they are. Co-speech gesture is thus excluded from the discussion, but is dealt with in detail in chapter 27.

In section 2, we will start our investigation with a discussion of hypotheses concerning the origin of (sign) languages, in particular, the gestural theory of language origin. In section 3, we present an overview of different types of manual communication systems – from gestural codes to natural sign languages – and we sketch how sign language research relates to linguistic typology. In particular, we will address selected topics in intra- and inter-modal typological variation. In the next two sections, the focus will be on specific types of sign languages, namely the tactile sign languages used in communication with deafblind people (section 4) and sign languages which, for various reasons, are developed and used within hearing groups or communities, the so-called ‘secondary sign languages’ (section 5).

2. The origin of sign languages

The origin and evolution of language is currently a hotly debated issue in evolutionary biology as well as in linguistics. Sign languages are interesting in this context because some scholars argue that manual communication may have preceded vocal communication. Since language does not fossilize, all the available evidence for evolutionary scenarios is indirect and comes from diverse sources including fossil evidence, cultural artifacts (such as Acheulean hand-axes), birdsong, and co-speech gesture. In the following, I will first present a brief sketch of what we (think we) know about language evolution (section 2.1) before turning to the gestural theory of language origin (section 2.2).

2.1. The evolution of language

According to Fitch (2005, 2010), three components have been identified as crucial for the human language faculty: *speech* (that is, the signal, be it spoken or signed), *syntax*, or grammar (that is, the combinatorial rules of language), and *semantics* (that is, our ability to convey an unlimited range of meanings).

Human speech production involves two key factors, namely our unusual vocal tract and vocal imitation. The descended larynx of humans enables them to produce a greater diversity of formant frequency patterns. While this anatomical change is certainly an important factor, recent studies indicate that “selective forces other than speech might easily have driven laryngeal descent at one stage of our evolution” (Fitch 2005, 199). Since other species with a permanently descended larynx have been discovered (e.g. lions), it is likely that the selective force is the ability to produce impressive vocalizations (the ‘size exaggeration hypothesis’; also see Fitch 2002). Still, it is clear that early hominids were incapable of producing the full range of speech sounds (Lieberman 1984; Fitch 2010).

Imitation is a prerequisite for language learning and communication. Interestingly, while non-human primates are highly constrained when it comes to imitation, other species, like birds and dolphins, are very good at imitating vocalizations. Birdsong in particular has attracted the attention of scholars because it shows interesting parallels with speech (Marler 1997; Doupe/Kuhl 1999). First, most songbirds learn their species-specific songs by listening to other members of their species. Second, they pass through a critical period in development; acquisition after the critical period results in defective songs. Third, at least some birdsong displays syntactic structure in that smaller units are combined to form larger units (Okanoya 2002). In contrast to human language, however, birdsong is devoid of compositional meaning.

Based on these parallels, it has been suggested (for instance, by Darwin) that the earliest stage of language evolution may have been musical. Fitch (2005, 220) refers to this stage as '*prosodic protolanguage*', that is, a language which is characterized by complex, learned vocalization but lacks compositional meaning. Presumably, the evolution of this protolanguage was driven by sexual selection (Okanoya 2002). At a later stage, communicative needs may have motivated the addition of semantics. "By this hypothesis, music is essentially a behavioral 'fossil' of an earlier human communication system" (Fitch 2005, 221; also see Fitch 2006).

While the above scenario could be paraphrased as 'syntax without semantics', an alternative scenario suggests that early stages of language were characterized by 'semantics without syntax'; this is referred to as '*asyntactic protolanguage*'. According to this hypothesis, protolanguage consisted of utterances of only a single word, or simple concatenations of words, without phrase structure (Jackendoff 1999; Bickerton 2003). Jackendoff (1999, 273) suggests that single-word utterances associated with high affect, such as *wow!*, *ouch!*, and *dammit!* are "fossils" of the one-word stage of language evolution – single-word utterances that for some reason are not integrated into the larger combinatorial system". Jackendoff further assumes that the first vocal symbols were holistic gestalts (pretty much like primate calls) and that a phonological system evolved when the repertoire of symbols (the lexicon) increased. Since a larger lexicon requires more phonological distinctions, one may speculate that the evolution of the vocal tract (the descended larynx) was "driven by the adaptivity of a larger vocabulary, through more rapid articulation and enhanced comprehensibility" (Jackendoff 1999, 274).

A third evolutionary scenario, which assumes a '*gestural protolanguage*', will be addressed in the following section. Before concluding this section, however, I want to point out that the recent isolation of a language-related gene, called Forkhead-box P2 (or FOXP2), has caused considerable excitement among linguists and evolutionary biologists (Vargha-Khadem et al. 1995). It has been found that the human version of FOXP2 is functionally identical in all populations worldwide, but differs significantly from that of chimpanzees. Statistical analysis of the relevant changes suggests that these changes occurred not more than 200,000 years ago in human phylogeny (see Fitch (2005, 2010) for details).

2.2. The gestural theory of language origin

I shall now describe one scenario, the gestural theory of language origin, in more detail because it emphasizes the crucial role of manual communication in the evolution of

language (Hewes 1973, 1978; Armstrong/Wilcox 2003, 2007; Corballis 2003). According to this theory, protolanguage was gestural, that is, composed of manual and facial gestures. The idea that language might have evolved from gestures is not a new one; actually, it has been around since the French Enlightenment of the 18th century, if not longer (Armstrong/Wilcox 2003). The gestural hypothesis is consistent with the existence of co-speech gesture (see chapter 27), which thus could be interpreted as a remnant of gestural protolanguage, and with the fact that sign languages are fully-fledged, natural languages. Further support comes from the observation that apes are considerably better at learning signs than speech (Gardner/Gardner/van Cantfort 1989).

As for anatomical developments, it has been established that bipedalism and enlargement of the brain are the defining anatomical traits of the hominid lineage (which separated from the lineage leading to chimpanzees approximately 5–6 million years ago). Once our ancestors became bipedal, the hands were available for tool use and gestural communication. Fossil evidence also indicates that about three million years ago, “the human hand had begun to move toward its modern configuration” while “the brain had not yet begun to enlarge, and the base of the skull, indicative of the conformation of the vocal tract, had not begun to change toward its modern, speech-enabling shape” (Armstrong/Wilcox 2003, 307). In other words: it seems likely that manual communication was possible before vocal communication, and assuming that there was a desire or need for an efficient exchange of information, gestural communication may have evolved.

Gradually, following a phase of co-occurrence, vocal gestures must have replaced manual gestures. However, given the existence of sign languages, the obvious question is why this change should have occurred in the first place. Undoubtedly, speech is more useful when interlocutors cannot see each other and while holding tools; also, it “facilitated pedagogy through the simultaneous deployment of demonstration and verbal description” (Corballis 2010, 5). Some scholars, however, doubt that these pressures would have been powerful enough to motivate a change from manual to vocal communication and thus criticize the gestural hypothesis (MacNeilage 2008).

In the 1990s, the gestural theory was boosted when mirror neurons (MNs) were discovered in the frontal cortex of non-human primates (Rizzolatti/Arbib 1998). MNs are activated both when the monkey performs a manual action and when it sees another monkey perform the same action. According to Fitch (2005, 220), this discovery is exciting for three reasons. First, MNs have “the computational properties that would be required for a visuo-manual imitation system”, and, as mentioned above, imitation skills are crucial in language learning. Second, MNs have been claimed to support the gestural theory because they respond to manual action (Corballis 2003). Third, and most importantly, MNs are located in an area of the primate brain that is analogous to Broca’s area in humans, which is known to play a central role in both language production and comprehension. The fact that (part of) Broca’s area is not only involved in speech but also in motor functions such as complex hand movements (Corballis 2010) lends further support to an evolutionary link between gestural and vocal communication (also see Arbib 2005).

Clearly, when it comes to the evolution of cognition in general, and the evolution of language in particular, one should “not confuse plausible stories with demonstrated truth” (Lewontin 1998, 129). Given the speculative nature of many of the issues addressed above, it seems impossible to prove that the gestural theory of language origin

is correct. According to Corballis (2010, 5), the gestural theory thus “best serves as a working hypothesis to guide research into the nature of language, and the genetic and evolutionary changes that gave rise to our species” – a statement that might as well be applied to the other evolutionary scenarios.

3. Sign language types and sign language typology

3.1. Sign language types

In this section, I will provide a non-exhaustive typology of manual communication systems (to use a fairly neutral term), proceeding from simple context-bound gestural codes to complex natural sign languages. We will see that more complex systems may evolve from simpler ones – a development which, to some extent, might mirror processes which presumably also played a role in the evolution of (sign) language.

First, there are gestural communication systems and technical manual codes used, for instance, over distances that preclude oral communication (such as the crane driver guider gestures described by Kendon (2004, 292 f.)), under water (manual symbols used by scuba divers), or in situations which require silence (for instance, manual communication during hunting; see e.g. Lewis (2009)). Clearly, all of these manual codes are only useful in very specific contexts. Still, the existence of hunting codes in particular is interesting in the present context because it has been argued that at least some sign languages may have developed from manual codes used during hunting (Divale/Zipin 1977; Hewes 1978).

Crucially, none of these gestural communication systems is used by deaf people. This is a feature they share with ‘secondary sign languages’, sign languages which, for various reasons, were developed and used by hearing people. The manual communication systems commonly subsumed under the label ‘secondary sign language’ (e.g. sign languages used by Australian Aboriginals or monks) show varying degrees of lexical and grammatical complexity, but all of them appear to be considerably more elaborate than the manual codes mentioned above. Aspects of the use and structure of secondary sign languages will be discussed in detail in section 5.

So-called ‘homesign’ systems are also used in highly restricted contexts, these contexts, however, not being situational in nature (e.g. diving, hunting) but rather being family contexts. Prelingually deaf children growing up in hearing families without sign language input may develop gestural communication systems to interact with their parents and siblings. Within a family, such systems may be quite effective means of communication, but typically, they are used for only one generation and are not transmitted beyond the family. While at first sight, a homesign system may appear to be a fairly simple conglomerate of mostly iconic gestures, research has shown that these gestures are discrete units and that there is evidence of morphological and syntactic structure (e.g. predicate frames, recursion) in at least some homesign systems (Goldin-Meadow 2003; see chapter 26 for extensive discussion). Homesign systems are known to have the potential to develop further into fully-fledged sign languages, once homesigners get in contact with each other, for example, at a boarding school – as has been

documented, for instance, for Nicaraguan Sign Language (Kegl/Senghas/Coppola 1999; see chapter 36, Language Emergence and Creolisation, for discussion).

Moving further from less complex systems towards ‘true’ sign languages, we find various types of manual communication systems that combine the lexicon of a sign language with structural elements of the surrounding spoken language. Such systems – for instance, Manually-Coded English (MCE) in the United States and *Nederlands met Gebaren* (Sign-supported Dutch) in the Netherlands – are commonly used in educational settings or, more generally, when Deaf signers interact with hearing second language learners of a sign language. Even within this class of systems, however, a considerable amount of structural variation exists (also see Crystal/Craig (1978), who refer to such systems as ‘contrived sign languages’). Some systems mirror the structure of a spoken language to the extent that functional morphemes are represented by dedicated signs or fingerspelling (e.g. the copula verb *be* or bound morphemes like *-ing* and third person singular *-s* in English-based systems). Other systems are closer to a particular sign language in that many of the grammatical mechanisms characteristic of the sign language are preserved (e.g. use of space, non-manual marking), but signs are ordered according to the rules of the spoken language (for MCE, see Schick (2003); also see chapter 35, Language Contact and Borrowing).

Turning finally to natural sign languages, further classifications have been proposed (Zeshan 2008). To some extent, these classifications reflect developments in the field of sign language linguistics (Perniss/Pfau/Steinbach 2007; also see chapter 38). In the 1960s and 1970s, linguistic research on sign languages started with descriptions of a number of *western sign languages*, such as American Sign Language (ASL), Sign Language of the Netherlands (NGT), and Swedish Sign Language (SSL). Apart from a few exceptions, it was only from the 1990s onwards that these descriptions were complemented by studies focusing on *non-western sign languages*, e.g. Brazilian Sign Language (LSB), Indopakistani Sign Language (IPSL), and Japanese Sign Language (NS). More recently, the so-called ‘*village sign languages*’, that is, sign languages used in village communities with a high incidence of genetic deafness, have entered the stage of sign language linguistics (see chapter 24 for discussion).

In Figure 23.1 different types of manual communication systems are arranged along a continuum of complexity and possible developmental paths from one system to another

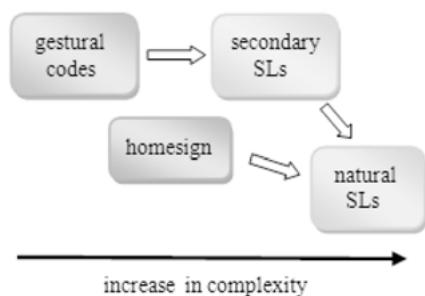


Fig. 23.1: Types of manual communication systems; the arrows indicate possible developments of one system into another



Fig. 23.2: The mosaic of sign language data (adapted from Zeshan 2008, 675)

other are pointed out. Focusing on the rightmost box in Figure 23.1, the natural sign languages, Zeshan (2008, 675) presents different subtypes in a 'mosaic of sign language data', an adapted version of which is presented in Figure 23.2. In this mosaic, western and non-western sign languages are both classified as '*urban sign languages*', contrasting them with *village sign languages*. Note that Zeshan also hypothesizes that further sign language types may yet have to be discovered (the '?'-box in Figure 23.2).

Taken together, the discussion in this section shows that manual communication systems differ from each other with respect to (at least) the following parameters: (i) complexity and expressivity of the system; (ii) type and size of community (or group) in which the system is used; and (iii) influence of surrounding spoken language on the system (see Crystal/Craig (1978, 159) for a classificatory matrix of different types of manual communication systems ('signing behaviors'), ranging from cricket signs via symbolic dancing to ASL).

3.2. Sign languages and linguistic typology

Having introduced different types of sign systems and sign languages, I will now zoom in on natural sign languages in order to address some of the attested inter-modal and intra-modal typological patterns and distinctions. Two questions will guide our discussion: (i) in how far can typological classifications that have been proposed on the basis of spoken languages be applied to sign languages, and (ii) to what extent do sign languages differ from each other typologically? Obviously, developments within the field of sign language typology have gone hand in hand with the increased number of sign languages being subject to linguistic investigation. Given that many typologically relevant aspects are discussed extensively in sections II and III of this handbook, I will only provide a brief overview of some of the phenomena that have been investigated from a typological perspective; I refer the reader to the relevant chapters for examples and additional references. I will focus on morphological typology, word order, negation, and agreement (also see Schuit/Baker/Pfau 2011; Slobin accepted).

3.2.1. Morphological typology

Spoken languages are commonly classified based on their morphological typology, that is, the amount of (linear) affixation and fusion. A language with only monomorphemic words is of the *isolating* type, while a language which allows for polymorphemic words is *synthetic* (or *polysynthetic* if it also features noun incorporation). A synthetic language in which morphemes are easily segmented is *agglutinative*; if segmentation is impossible, it is called *fusional* (Comrie 1989).

Signs are known to be of considerable morphological complexity (Aronoff/Meir/Sandler 2005), but the fact that morphemes tend to be organized simultaneously rather than sequentially makes a typological classification less straightforward. Consider, for instance, the NGT verb GIVE. In its base form, this verb is articulated with a R -hand and consists of a location-movement-location (L-M-L) sequence (movement away from the signer's body). The verb can be modified such that it expresses a complex meaning like, for example, 'You give me a big object with some effort' by changing the hand-

shape, the direction and manner of movement, as well as non-manual features. All of these changes happen simultaneously, such that the resulting sign is still of the form L-M-L; no sequential affixes are added. Simultaneity, however, is not to be confused with fusion; after all, all of the morphemes involved (*viz.* subject and object agreement, classifier, manner adverb) are easily segmented. It therefore appears that NGT is agglutinative (a modality-independent classification), but that morphemes are capable of combining simultaneously (a modality-specific feature). Surely, simultaneous morphology is also attested in spoken languages (e.g. tone languages) but usually, there is a maximum of two simultaneously combined morphemes.

As for intra-modal typology, it appears that all sign languages investigated to date are of the same morphological type. Still, it is possible that they differ from each other in the amount of manual and non-manual morphological operations that can be applied to a stem (Schuit 2007).

3.2.2. Word order

In the realm of syntax, word order (or, more precisely, constituent order) is probably the typological feature that has received most attention. For many spoken languages, a basic word order has been identified, where 'basic' is usually determined by criteria such as frequency, distribution, pragmatic neutrality, and morphological markedness (Dryer 2007). Typological surveys have revealed that by far the most common word orders are S(ubject)-O(bject)-V(erb) and SVO. In Dryer's (2011) sample of 1377 languages, 565 are classified as SOV (41 %) and 488 (35 %) as SVO. The third most frequent basic word order is VSO, which is attested in 95 (7 %) of the languages in the sample. In other words: in 83 % of all languages, the subject precedes the verb, and in 79 % (including the very few OVS and VOS languages), the object and the verb are adjacent. However, it has been argued that not all languages exhibit a basic word order (Mithun 1992). According to Dryer, 189 languages in his sample (14 %) lack a dominant word order.

Given that to date, word order has only been investigated for a small number of sign languages, it is impossible to draw firm conclusions. A couple of things, however, are worth noting. First, in all sign languages for which a basic word order has been identified, the order is either SOV (e.g. Italian Sign Language, LIS) or SVO (e.g. ASL). Second, for some sign languages, it has also been suggested that they lack a basic word order (Bouchard 1997). Third, it has been claimed that in some sign languages, word order is not determined by syntactic notions, but rather by pragmatic (information structure) notions, such as Topic-Comment. Taken together, we can conclude (i) that word order typology can usefully be applied to sign languages, and (ii) that sign languages differ from each other in their basic word order (see Kimmelman (2012) for a survey of factors that may influence word order; also see chapter 12 for discussion).

3.2.3. Negation

In all sign languages studied to date, negation can be expressed manually (*i.e.* by a manual particle) and non-manually (*i.e.* by a head movement). Therefore, at first sight,

the expression of negation appears to be typologically highly homogenous. However, based on a typological survey, Zeshan (2004) proposes that sign language negation actually comes in two different types: *manual dominant* and *non-manual dominant* systems. The former type of system is characterized by the fact that the use of a manual negative particle is obligatory; such a system has been identified in, for example, Turkish Sign Language (TİD) and LIS. In contrast, in non-manual dominant sign languages, sentences are commonly negated by a non-manual marker only; this pattern is found, for instance, in NGT, ASL, and IPSL. Moreover, there are differences with respect to the non-manual marker. First, as far as the form of the marker is concerned, some sign languages (e.g. TİD) employ a backward head tilt, in addition to a negative headshake (which is the most common non-manual marker across all sign languages studied). Second, within the group of non-manual dominant sign languages, there appear to be sign language specific constraints concerning the scope of the non-manual marker (see chapter 15 for discussion).

As for the typology of negation in spoken languages, an important distinction is that between *particle* negation (e.g. English) and *morphological/affixal* negation (e.g. Turkish). Moreover, in languages with *split negation* (e.g. French), two negative elements – be it two particles or a particle and an affix – are combined to negate a proposition (Payne 1985). According to Pfau (2008), this typology can be applied to sign languages. He argues that, for instance, German Sign Language (DGS), a non-manual dominant sign language, has split negation, with the manual negator being a particle (which, however, is optional) and the non-manual marker, the headshake, being an affix which attaches to the verb. In contrast, LIS has simple particle negation; in this case, the particle may be lexically specified for a headshake. If this account is on the right track, then, as before, we find inter-modal typological similarities as well as intra-modal differences.

3.2.4. Agreement

The sign language phenomenon that some scholars refer to as ‘agreement’ is particularly interesting from a cross-modal typological point of view because it is realized in the signing space by modulating phonological properties (movement and/or orientation) of verbs (see chapter 7 for extensive discussion; for a recent overview also see Lillo-Martin/Meier (2011)).

We know from research on spoken languages that languages differ with respect to the ‘richness’ of their verbal agreement systems. At the one end of the continuum lie languages with a ‘rich’ system, where every person/number distinction is spelled out by a different morphological marker (e.g. Turkish); at the other end, we find languages in which agreement is never marked, that is, ‘zero’ agreement languages (e.g. Chinese). All languages that fall in between the two extremes could be classified as ‘poor’ agreement languages (e.g. English, Dutch). A further classification is based on the distinction between subject and object agreement. In spoken languages, object agreement is more marked than subject agreement, that is, all languages that have object agreement also have subject agreement, while the opposite is not the case. Finally, in a language with agreement – be it rich or poor – generally all verbs agree in the same way (Corbett 2006).

All of these aspects appear to be different in sign languages. First, in all sign languages for which an agreement system has been described, only a subgroup of verbs (the so-called ‘agreeing’ verbs) can be modulated to show agreement (Padden 1988). Leaving theoretical controversies aside, one could argue that agreeing verbs mark every person/number distinction differently, that is, by dedicated points in space. In contrast, other verbs (‘plain verbs’) can never change their form to show agreement. Hence, in a sense, a rich and a zero agreement system are combined within a single sign language. Second, subject agreement has been found to be generally more marked than object agreement in that (i) some verbs only show object agreement and (ii) subject agreement is sometimes optional.

In addition, while agreement markers for a certain person/number combination may differ significantly across spoken languages, all sign languages that mark agreement do so in a strikingly similar way. Still, we also find intra-modal variation. Some sign languages, for instance, do not display an agreement system of the type sketched above (e.g. Kata Kolok, a village sign language of Bali (Marsaja 2008)). In other sign languages, agreement can be realized by dedicated auxiliaries in the context of plain verbs (see chapter 10 for discussion). It thus seems that in the realm of agreement, well-known typological classifications are only of limited use when it comes to sign languages (also see Slobin (accepted) for a typological perspective on sign language agreement). Space does not allow me to go into detail, but at least some of the patterns we observe are likely to result from specific properties of the visual modality, in particular, the use of signing space and the body of the signer (Meir et al. 2007).

3.2.5. Summary

The above discussion makes clear that sign language typology is a worthwhile endeavor – both from an inter- and intra-modal perspective. One can only agree with Slobin (in press), who points out that “the formulation of typological generalizations and the search for language universals must be based [...] on the full set of human languages – spoken and signed”. As for inter-modal variation, we have seen that certain (but not all) typological classifications are fruitfully applied to sign languages. Beyond the aspects addressed above, this has also been argued for the typology of relative clauses: just like spoken languages, sign languages may employ head-internal or head-external relative clauses (see chapter 16, Complex Sentences, for discussion). Slobin (accepted) discusses additional typological parameters such as locus of marking (head- vs. dependent marking), framing (verb- vs. satellite-framed), and subject vs. topic-prominence, among others, and concludes that *all* sign languages are head-marking, verb-framed, and topic-prominent, that is, that there is no intra-modal variation in these areas. This brings us back to the question whether sign languages – certain typological differences notwithstanding – are indeed typologically more similar than spoken languages and in how far the modality determines these similarities – a question that I will not attempt to answer here (see chapter 25, Language and Modality, for further discussion).

Obviously, recurring typological patterns might also be due to genetic relationships between sign languages (see chapter 38) or reflect the influence of certain areal features also attested in surrounding spoken languages (e.g. use of question particles in

East Asian sign languages). In addition, socio-demographic factors such as type of community (community size and number of second language learners) and size of geographical area in which a language is used have also been argued to have an influence on certain grammatical properties of a language (Kuster 2003; Lupyán/Dale 2010). This latter factor might, for instance, result in a certain degree of typological homogeneity among village sign languages. At present, however, only little is known about the impact of such additional factors on sign language typology.

4. Tactile sign languages

Sign languages are visual languages and therefore, successful signed communication crucially relies on visual contact between the interlocutors (as pointed out in section 2.2, this constraint may have contributed to the emergence of spoken languages). As a consequence, sign language is not an accessible means of communication for people who are deaf and blind. Tactile sign languages are an attempt to overcome this obstacle by shifting the perception of the language from the visual to the haptic channel. Obviously, this shift requires certain accommodations. In this section, I will first say a few words about the etiology of deafblindness before turning to characteristic features of tactile sign languages.

4.1. Deafblindness

‘Deafblindness’ is a cover term which describes the condition of people who suffer from varying degrees of visual *and* hearing impairment. It is important to realize that the term does not necessarily imply complete deafness and blindness; rather, deafblind subjects may have residual hearing and/or vision. Still, all deafblind have in common that their combined impairments impede access to visual and acoustic information to the extent that signed or spoken communication is no longer possible.

Deafblindness (DB) may have various etiologies. First, we have to distinguish congenital DB from acquired DB. Congenital DB may be a symptom associated with congenital rubella (German measles) syndrome, which is caused by a viral infection of the mother during the first months of pregnancy. Congenital DB rarely occurs in isolation; it usually co-occurs with other symptoms such as low birth weight, failure to thrive, and heart problems. The most common cause for acquired DB appears to be one of the various forms of Usher syndrome, an autosomal recessive genetic disorder. All subjects with Usher syndrome suffer from *retinitis pigmentosa*, a degenerative eye disease which affects the retina and leads to progressive reduction of the visual field (tunnel vision), sometimes resulting in total blindness. Usher type 1 is characterized by congenital deafness while subjects with Usher type 2 are born hard-of-hearing. Occasionally, in the latter type, hearing loss is progressive. In addition, DB may result from hearing and/or visual impairments associated with ageing – actually, this is probably the most common cause for DB. Three patterns have to be distinguished: (i) a congenitally deaf person suffers from progressive visual impairment; (ii) a congenitally blind person suffers from progressive hearing loss; or (iii) a person born with normal





Fig. 23.4: Positioning of hands in tactile sign language; the person on the right is the receiver (source: <http://www.flickr.com>)

ure 23.4) or are in different positions, one under and one on top of the signer's hands (dialogue position; Mesch 2001). In two-handed interactions, the signer and the receiver are located next to each other. In this setting, the receiver is usually more passive (e.g. when receiving information from an interpreter). In both settings, the physical proximity of signer and receiver usually results in a reduced signing space.

In the following subsections, we will consider additional accommodations at various linguistic levels that tactile communication requires.

4.2.1. Phonology

As far as the phonology of signs is concerned, Collins and Petronio (1998) observe that handshapes were not altered in tactile ASL, despite the fact that some handshapes are difficult to perceive (e.g. ASL number handshapes in which the thumb makes contact with one of the other fingers). Due to the use of a smaller signing space, the movement paths of signs were generally shorter than in visual ASL. Moreover, the reduced signing space was also found to affect the location parameter; in particular, signs without body contact tend to be displaced towards the center of the signing space. Balder et al. (2000) describe how in NGT, signs that are usually articulated in the signing space (e.g. WALK) are sometimes articulated on the receiver's hand. In signs with body contact, Collins and Petronio (1998) observe an interesting adaptation: in order to make the interaction more comfortable, the signer would often move the respective body part towards the signing hand, instead of just moving the hand towards the body part to make contact. Finally, adaptations in orientation may result from the fact that the receiver's hand rests on top of the signer's hand. Occasionally, maintaining the correct orientation would require the receiver's wrist to twist awkwardly. Collins and Petronio do not consider non-manual components such as mouthings and mouth gestures. Clearly, such components are not accessible to the deafblind receiver. Balder et al. (2000) find that in minimal pairs that are only distinguished by mouthing (such as the NGT signs BROTHER and SISTER), one of the two would undergo a handshape change: BROTHER is signed with a -hand instead of a -hand.

4.2.2. Morphology

Non-manuals also play a crucial role in morphology because adjectival and adverbial modifications are commonly expressed by non-manual configurations of the lower face (Liddell 1980; Wilbur 2000). The data collected by Collins and Petronio (1998) suggest that non-manual morphemes are compensated for by subtle differences in the sign's manual articulation. For instance, instead of using the non-manual adverbial "mm", which expresses relaxed manner, a verbal sign (e.g. DRIVE) can be signed more slowly and with less muscle tension (also see Collins 2004). For NGT, Balder et al. (2000) also observe that manual signs may replace non-manual modifiers; for example, the manual sign VERY-MUCH may take over the function of an intensifying facial expression accompanying the sign ANGRY to express the meaning 'very angry'.

4.2.3. Syntax

Interesting adaptations are also attested in the domain of syntax, and again, for the most part, these adaptations are required to compensate for non-manual markers. Mesch (2001) presents a detailed analysis of interrogative marking in tactile SSL. Obviously, yes/no-questions pose a bigger challenge in tactile conversation since wh-questions usually contain a wh-sign which is sufficient to signal the interrogative status of the utterance. Almost half of the yes/no-questions from Mesch's corpus are marked by an extended duration of the final sign. Mesch points out, however, that such a sentence-final hold also functions more generally as a turn change signal; it can thus not be considered an unambiguous question marker. In addition, she reports an increased use of pointing to the addressee (INDEX_{adr}) in the data; for the most part, this INDEX occurs sentence-finally, but it may also appear initially, in second position, and it may be doubled, as in (1a). In this example, the final INDEX is additionally marked by an extended duration of 0.5 seconds (Mesch 2001, 148).

- (1) a. INDEX_{adr} INTERESTED FISH REEL-IN INDEX_{adr}-dur(0.5) [Tactile SSL]
 'Are you interested in going fishing?'
 b. INDEX_{adr} WHAT PLANE WHAT [Tactile ASL]
 'What kind of a plane was it?'

Other potential manual markers such as an interrogative (palm up) gesture or drawing of a question mark after the utterance were uncommon in Mesch's data. In contrast, yes/no-questions are commonly ended with a general question sign in tactile NGT and tactile ASL (Balder et al. 2000; Collins/Petronio 1998). Moreover, Collins and Petronio report that in their data, many wh-questions also involve an initial INDEX towards the receiver. Note that in the tactile ASL example in (1b), the INDEX is neither subject nor object of the question (adapted from Collins/Petronio (1998, 30)); rather, it appears to alert the receiver that a question is directed to him.

None of the above-mentioned studies considers negation in detail. While the negative polarity of an utterance is commonly signaled by a negative headshake only in the sign languages under investigation, it seems likely that in their tactile counterparts, the

use of manual negative signs is required (see Frankel (2002) for the use of tactually accessible negation strategies in deafblind interpreting).

In a study on the use of pointing signs in re-told narratives of two users of tactile ASL, Quinto-Pozos (2002) observes a striking lack of deictic pointing signs used for referencing purposes, i.e. for establishing or indicating a pre-established arbitrary location in signing space, which is linked to a non-present human, object, or locative referent. Both deafblind subjects only used pointing signs towards the recipient of the narrative (2nd person singular). In order to indicate other animate or inanimate referents, one subject made frequent use of fingerspelling while the other used nominal signs (e.g. GIRL, MOTHER) or a sign (glossed as SHE) which likely originated from Signed English. Quinto-Pozos hypothesizes that the lack of pointing signs might be due to the non-availability of eye gaze, which is known to function as an important referencing device in visual ASL. The absence of eye gaze in tactile ASL “presumably influences the forms that referencing strategies take in that modality” (Quinto-Pozos 2002, 460). Also, at least in the narratives, deictic points towards third person characters have the potential to be ambiguous. Quinto-Pozos points out that deafblind subjects probably use pointing signs more frequently when referring to the location of people or objects in the immediate environment.

4.2.4. Discourse

As far as discourse organization is concerned, most of the available studies report that tactile sign languages employ manual markers for back-channeling and turn-taking instead of non-manual signals such as head nods and eye gaze (Baker 1977). Without going into much detail, manual feedback markers include signs like OH-I-SEE (nodding ♡-hand), different types of finger taps that convey meanings such as “I understand” or “I agree”, squeezes of the signer’s hand, and repetition of signs by the receiver (Collins/Petronio 1998; Mesch 2001). Turn-taking signals on the side of the signer include a decrease in signing speed and lowering of the hands (see Mesch (2001, 82 ff.) for a distinction of different conversation levels in tactile SSL). Conversely, if the receiver wants to take over the turn, he may raise his hands, lean forward, and/or pull the passive hand of the signer slightly (Balder et al. 2000; Schwartz 2009).

In addition, deafblind people who interact on a regular basis may agree on certain “code signs” which facilitate the communication. A code sign may signal, for instance, that someone is temporarily leaving the room or it may indicate an emergency. For tactile NGT, Balder et al. (2000) mention the possibility of introducing a sentence by the signs TEASE or HAHA to inform the receiver that the following statement is not meant seriously, that is, to mark the pragmatic status of the utterance.

4.2.5. Summary

Taken together, the accommodations sketched above allow experienced deafblind signers to converse fluently in a tactile sign language. Thanks to the establishment of national associations for the deafblind, contact between deafblind people is increasing, possibly leading to the emergence of a Deafblind culture, distinct from, but embedded

within, Deaf culture (MacDonald 1994). It is to be expected that an increase in communicative interaction will lead to further adaptations and refinements of the source sign language to meet the specific needs of deafblind users.

5. Secondary sign languages

In contrast to the sign languages discussed in the previous sections, secondary sign languages (sometimes also referred to as ‘alternate sign languages’) do not result from the specific communicative needs of deaf or deafblind people. Rather, they are developed in hearing societies in which they are used as a substitute for spoken language in certain situations. Amongst the motivations for the development of a secondary sign language are religious customs and the need for a mode of communication in contact situations. Generally, secondary sign languages are not full-fledged natural sign languages but rather gestural communication systems, or ‘kinesic codes’ (Kendon 2004), with restricted uses and varying degree of elaboration. This crucial difference notwithstanding, the term ‘sign language’ will be used throughout this section. Four types of secondary sign languages will be considered in the following subsections: Sawmill Sign Language, monastic sign languages, Aboriginal sign languages of Australia, and Plains Indian Sign Language. In all subsections, an attempt will be made to provide information about the origin and use of the respective sign language, its users, and selected aspects of its structure.

It should be pointed out at the outset, however, that the four sign languages addressed in this section are highly diverse from a linguistic and sociolinguistic point of view – possibly too diverse to justify subsuming them under a single label. I will get back to this issue in sections 5.4 and 5.5.

5.1. Sawmill Sign Language

In section 3.1, I pointed out that simple gestural communication systems are sometimes used in settings that preclude oral communication (e.g. hunting, diving). Occasionally, such gestural codes may develop into more complex systems (see Figure 23.1). In this section, I will discuss a sign language which emerged in a saw mill, that is, in an extremely noisy working environment in which a smooth coordination of work tasks is required.

5.1.1. On the origin and use of Sawmill Sign Language

According to Johnson (1977), a sawmill sign language – he also uses the term ‘industrial sign-language argot’ – has been used widely in the northwestern United States and western Canada. The best-documented case is a language of manual gestures spontaneously created by sawmill workers in British Columbia (Canada) (Meissner/Philpott 1975a,b). For one of the British Columbia mills, Meissner and Philpott describe a typical situation in which the sign language is used: the communicative interaction between

C. HOW FOOTBALL GO

‘How’s the football game going?’

When comparing sign use in five mills, Meissner and Philpott (1975a) observe that a reduction of workers due to increased automation leads to a decline in the rate of manual communication. They speculate that further automation will probably result in the death of the sign language. It thus seems likely that at present (i.e. 37 years later), Sawmill Sign Language is not used anymore.

Johnson (1977) reports a single case of a millworker – in Oregon, not in British Columbia – who, after becoming deaf, used sign language to communicate with his wife and son. Johnson claims that this particular family sign language is an extension of the sawmill sign language used in southeast Oregon. Based on a lexical comparison, he concludes that this sign language is closely related to the Sawmill Sign Language described by Meissner and Philpott.

5.1.2. Lexicon and structure of Sawmill Sign Language

Based on direct observation and consultation with informants, Meissner and Philpott (1975b) compiled a dictionary of 133 signs, 16 of which are number signs and eight specialized technical signs (e.g. LOG-NOT-TIGHT-AGAINST-BLOCKS). Some number signs may also refer to individuals; TWO, for instance, refers to the engineer and FIVE to the foreman, corresponding to the number of blows on the steam whistle used as call signals. Not surprisingly, most of the signs are iconically motivated. The signs WOMAN and MAN, for example, are based on characteristic physical properties in that they refer to breast and moustache, respectively. Other signs depict an action or movement, e.g. turning a steering wheel for CAR and milking a cow for FARMER (2a). Interestingly, pointing to the teeth signifies SAW-BLADE. Meissner and Philpott also describe “audiomimic” signs in which the form of the sign is motivated by phonological similarity of the corresponding English words: grasping the biceps for WEEK (*week* – *weak*), grasping the ear lobe for YEAR (*ear* – *year*), and use of the sign TWO in the compound TWO^DAY (‘Tuesday’; cf. the use of TWO (for ‘to’) and FOUR (‘for’) described in the next section).

The authors found various instances in which two signs are combined in a compound, such as WOMAN^BROTHER (‘sister’), FISH^DAY (‘Friday’), and KNOCK^UP (‘pregnant’, cf. (2b)). At least for the first of these, the authors explicitly mention that the order of signs cannot be reversed. Also note that the first two examples are not loan translations from English.

Pointing is used frequently for locations (e.g. OVER-THERE) and people; lip and face movements (including mouthings) may help in clarifying meanings. In order to disambiguate a name sign that could refer to several people, thumb pointing can be used. As for syntactic structure, the examples in (2) suggest that the word order of Sawmill Sign Language mirrors that of English. However, just as in many other sign languages, a copula does not exist. Depending on the distance between interlocutors, interrogatives are either introduced by a non-manual marker (raised eyebrows or backward jerk of head) or by the manual marker QUESTION, which is identical to the sign HOW (2c), which is articulated with a fist raised to above shoulder height, back of hand facing

outward. Meissner and Philpott do not mention the existence of grammatical non-manual markers that accompany strings of signs, but they do point out that mouthing of a word may make a general reference specific. In conclusion, it appears that generally, “the sawmill sign language is little constrained by rules and open to constant innovation” (Meissner/Philpott 1975a, 300).

5.2. Monastic sign languages

While noise was the motivation for development of the sawmill sign language discussed in the previous section, in this section, the relevant factor is silence. Silence plays a significant and indispensable role in monastic life. It is seen as a prerequisite to a life without sin. “The usefulness of silence is supremely necessary in every religious institute; in fact, unless it is properly observed, we cannot speak of the religious life at all, for there can be none” (Wolter 1962; cited in Barakat 1975, 78). Hence, basically all Christian monastic orders impose a law of silence on their members. However, only in a few exceptional cases, this law of silence is total. For the most part, it only applies to certain locations in the cloister (e.g. the chapel and the dormitory) and to certain times of the day (e.g. during reading hours and meals).

5.2.1. On the origin and use of monastic sign languages

According to van Rijnberk (1953), a prohibition against speaking was probably imposed for the first time in 328 by St. Pachomius in a convent in Egypt. In the sixth century, St. Benedict of Nursia wrote “The Rule of Benedict”, an influential guide to Western monasticism, in which he details spiritual and moral aspects of monastic life as well as behavioral rules. Silence is a prominent feature in the Rule. In chapter VI (“Of Silence”), for instance, we read: “Therefore, because of the importance of silence, let permission to speak be seldom given to perfect disciples even for good and holy and edifying discourse, for it is written: ‘In much talk thou shalt not escape sin’ (Prov 10:19)” (Benedict of Nursia 1949). St. Benedict also recommends the use of signs for communication, if absolutely necessary (chapter XXXVIII: “If, however, anything should be wanted, let it be asked for by means of a sign of any kind rather than a sound”). Later, all of the religious orders that emerged from the order of St. Benedict – the Cistercians, Trappists, and Cluniacs – maintained the prescription of silence. A fixed system of signs came into appearance with the foundation of Cluny in the year 909 (Bruce 2007). In 1068, a monk named Bernard de Cluny compiled a list of signs, the *Notitia Signorum*. This list contains 296 signs, “a sizeable number which seems to indicate that many were in use before they were written down” (Barakat 1975, 89). Given an increasing influence of the Cluniacs from the eleventh century on, signs were adopted by other monasteries throughout Western Europe (e.g. Great Britain, Spain, and Portugal).

It is important to point out that monastic sign languages were by no means intended to increase communication between monks in periods of silence. Rather, the limited inventory of signs results from the desire to restrict communication. “The administration of the Order has rarely seen fit to increase the sign inventory for fear of intrusion

upon the traditional silence and meditative atmosphere in the monasteries” (Barakat 1975, 108) – one may therefore wonder why Barakat’s dictionary includes compound signs like WILD+TIME (‘party’). Signs may vary from one convent to another but generally, as remarked by Buysens (1956, 30f.), the variation is limited “de sorte qu’un Trappiste de Belgique peut parfaitement se faire comprendre d’un Trappist de Chine”.

5.2.2. Lexicon and structure of Cistercian Sign Language

The most thorough studies on monastic sign language to date are the ones by Barakat (1975) and Bruce (2007). Barakat studied the sign language as used by the monks of St. Joseph’s Abbey in Spencer, Massachusetts. His essay on the history, use, and structure of Cistercian Sign Language (CisSL) is supplemented by a 160-page dictionary, which includes photographs of 518 basic signs and the manual alphabet as well as lists describing derived (compound) signs, the number system, and signs for important saints and members of St. Joseph’s Abbey. In contrast, Bruce (2007) explores the rationales for religious silence and the development and transmission of manual forms of communication. His study contains some information on the Cluniac sign lexicon and the visual motivation of signs, but no further linguistic description of the language. In the following, I will therefore focus for the most part on the information provided by Barakat (but also see Stokoe (1978)).

Many of the signs that are used reflect in some way the religious and occupational aspects of the daily lives of the brothers. Barakat distinguishes five different types of signs. First, there are the *pantomimic signs*. These are concrete signs which are easily understood because they either manually describe an object or reproduce actual body movements that are associated with the action the sign refers to. Signs like BOOK and CROSS belong to the former group while signs like EAT and SLEEP are of the latter type. Not surprisingly, these signs are very similar or identical to signs described for natural sign languages. Secondly, the group of *pure signs* contains signs that bear no relation to pantomimic action or speech. These signs are arbitrary and are therefore considered “true substitutes for speech, [...] an attempt to develop a sign language on a more abstract and efficient level” (Barakat 1975, 103). Examples are GOD (two ✎-hands contact each other to form a triangle), DAY (✎-hand contacts cheek), and YELLOW (✎-hand draws a line from between eyebrows to tip of nose). Group three comprises what Barakat refers to as *qualitative signs*. Here, the relation between a sign and its meaning is associative, “roughly comparable to metaphor or connotation in spoken language” (p. 104). Most of the signs in this group are compounds. Geographical notions, for instance, generally include the sign COURTYARD plus modifier(s), as illustrated by the examples in (3).

- (3) a. DRINK + T + COURTYARD (‘England’) [CisSL]
 b. RED + COURTYARD (‘Russia’)
 c. SECULAR + COURTYARD + SHOOT + PRESIDENT + K (‘Dallas, TX’)

The examples also illustrate that use is made of handshapes from the manual alphabet: the ‘T’ in (3a) representing ‘tea’, the ‘K’ in (3c) as a stand-in for ‘Kennedy’ (note that this manual alphabet is different from the one used in ASL). Other illustrative exam-

ples of qualitative signs are MASS + TABLE ('altar'), RED + METAL ('copper'), and BLACK + WATER ('coffee').

The last two groups of signs are interesting because they include complex signs that are partially or completely dependent upon speech by exploiting homonymy (e.g. *knee* – *ney*, see below) as well as fingerspelling. Most of these signs are invented to fill gaps in the vocabulary. Barakat distinguishes between *signs partially dependent on speech* and *speech signs*, but the line between the two groups appears to be somewhat blurry. Clear examples of the former type are combinations that reflect derivational processes such as, for example, SING + R ('singer') and SHINE + KNEE ('shiney') – this is reminiscent of the phenomenon that Meissner and Philpott refer to as 'audiomimic' signs. In the latter group, we find combinations such as SIN + SIN + A + T ('Cincinnati, Ohio') and DAY + V ('David').

Stokoe (1978) compares the lexicons of CisSL and ASL and finds that only one out of seven CisSL signs (14%) resembles the corresponding ASL sign. It seems likely that most of these signs are iconic, that is, belong to the group of pantomimic signs. Stokoe himself points out that in many cases of resemblances, the signs may be related to 'emblems' commonly used in American culture (e.g. DRIVE, TELEPHONE). Based on this lexical comparison, he concludes that CisSL and ASL are unrelated and have not influenced each other.

Turning to morphology, there seems to be no evidence for morphological structure beyond the process referred to as compounding above and the derivational processes that are based on spoken language. But even in CisSL compounds, signs are merely strung together and there is no evidence for the phonological reduction or assimilation processes that are characteristic of ASL compounds (Klima/Bellugi 1979; see chapter 5, Word Classes and Word Formation, for discussion). Thus, the CisSL combination HARD + WATER can be interpreted as 'ice' but also as 'hard water'. In contrast, a genuine ASL compound like SOFT[^]BED can only mean 'pillow' but not 'soft bed'. Barakat distinguishes between *simple derived signs*, which consist of a maximum of three signs, and *compound signs*, which combine more than three signs. Compound signs may be of considerable complexity, as shown by the examples in (4). Clearly, expressing that Christ met Judas in Gethsemane would be a cumbersome task.

- (4) a. VEGETABLE + COURTYARD + CROSS + GOD + PRAY + ALL + TIME [CisSL]
 'Gethsemane' (= 'the garden (VEGETABLE + COURTYARD) where
 Christ (CROSS + GOD) prayed for a long time')
- b. SECULAR + TAKE + THREE + O + WHITE + MONEY + KILL + CROSS + GOD
 'Judas' (= 'man who took thirty pieces of silver (WHITE + MONEY)
 that killed Christ (CROSS + GOD)')

While simple signs generally have a fixed constituent order, the realization of compound signs may "vary considerably from brother to brother because of what they associate with the places or events" (Barakat 1975, 114f.).

With respect to syntactic structure, Barakat (1975, 119) points out that, for the most part, the way signs are combined into meaningful utterances "is dependent upon the spoken language of the monks and the monastery in which they live". Hence, in CisSL of St. Joseph's Abbey, subject-verb-complement appears to be the most basic pattern. Index finger pointing may serve the function of demonstrative and personal pronouns,

but only when the person or object referred to is in close proximity. Occasionally, fingerspelled 'B' and 'R' are used as the singular (7ab) and plural copula, respectively. Negation is expressed by the manual sign NO, which occupies a pre-verbal position, just as it does in English (e.g. BROTHER NO EAT).

CisSL does not have a dedicated interrogative form. Barakat observes that yes/no-questions are preceded or followed by either a questioning facial expression or a question mark drawn in the air with the index finger. Also, there is only one question word that finds use in wh-questions; Barakat glosses this element as WHAT and notes that it may combine with other elements to express specific meanings, e.g. WHAT + TIME ('when') or WHAT + RELIGIOUS ('who'; literally 'what monk'). Such simple or complex question signs always appear sentence-initially. From his description, we may infer that a questioning look is not observed in wh-questions.

Finally, the expression of complex sentences including dependent clauses appears to be difficult in CisSL. "The addition of such clauses is one source of garbling in the language and most, if not all, the monks interviewed had some trouble with them" (Barakat 1975, 133). The complex sentence in (5a) is interesting in a couple of respects: first, the sign ALL is used as a plural marker; second, RULE expresses the meaning of *how*, while the connective *but* is realized by the combination ALL + SAME; third, the sign TWO is used as infinitival *to*; and finally, the plural pronoun *we* is a combination of two indexical signs (Barakat 1975, 134).

- (5) a. ALL MONK KNOW RULE TWO GIVE VEGETABLE SEED [CisSL]
 ALL SAME IX₂ IX₁ NOT KNOW RULE
 'The monks know how to plant vegetables but we don't.'
 b. WOOD IX₂ GIVE IX₁ INDULGENCE TWO GO TWO WORK
 'Can I go to work?'

Modal verbs are generally expressed by circumlocutions. Example (5b) shows that *can* is paraphrased as 'Would you give me permission', the sign WOOD being used for the English homonym *would*. As a sort of summary, I present part of The Lord's Prayer in (6). Note again the use of the sign COURTYARD, of fingerspelled letters, of concatenated pronouns, and of the combination of FOUR + GIVE to express *forgive*.

- (6) a. IX₂ IX₁ FATHER STAY GOD COURTYARD BLESSED B IX₂ NAME [CisSL]
 'Our Father, who art in Heaven, hallowed be thy name;'
 b. IX₂ KING COURTYARD COME IX₂ W B ARRANGE
 'thy kingdom come, thy will be done,'
 c. THIS DIRT COURTYARD SAME GOD COURTYARD
 'on earth as it is in Heaven.'
 d. GIVE IX₂ IX₁ THIS DAY IX₂ IX₁ DAY BREAD
 'Give us this day our daily bread,'
 e. FOUR GIVE IX₂ IX₁ SIN SAME IX₂ IX₁ FOUR GIVE SIN ARRANGE FAULT
 'and forgive us our trespasses as we forgive those who trespass against us.'

Some of the solutions the Cistercians came up with appear rather ingenious. Still, it is clear that the structure is comparably simple and that there is a strong influence from the surrounding spoken language. Barakat stresses the fact that CisSL has traditionally

been intended only for the exchange of brief, silent messages, and that, due to its “many defects”, it can never be an effective means for communicating complex messages. He concludes that “[a]lthough this sign language, as others, is lacking in many of the grammatical elements necessary for expressing the nuances of thought, it does function very effectively within the context of the monastic life” (Barakat 1975, 144).

5.3. Aboriginal sign languages

The use of complex gestural or sign systems by Aborigines has been reported for many different parts of Australia since the late 19th century. Kendon (1989, 32) provides a map indicating areas where sign language has been or still is used; for the sign languages still in use, symbols on the map also provide information on the frequency of use and the complexity of the system. The symbols suggest that the most complex systems are found in the North Central Desert area and on Cape York. Kendon himself conducted his research in the former area, with particular attention to the sign languages of the Warlpiri, Warumungu, and Warlmanpa (Kendon 1984, 1988, 1989). In his earlier studies, Kendon speaks about Warlpiri Sign Language (WSL – since all of the data were collected in the Warlpiri community of Yuendumu), but in his 1989 book, he sometimes uses the cover term North Central Desert Sign Languages (NCDSLs). Another study (Cooke/Adone 1994) focuses on a sign language used at Galiwin’ku and other communities in Northeast Arnhemland, which is referred to as Yolngu Sign Language (YSL). According to the authors, YSL bears no relation to the sign languages used in Central Australia (beyond some shared signs for flora, fauna, and weapons; Dany Adone, personal communication).

5.3.1. On the origin and use of Aboriginal sign languages

Kendon (1984) acknowledges that NCDSLs may, in the first instance, have arisen for use during hunting, as is also suggested by Divale and Zippin (1977, 186), who point out that the coordination of activities during hunting “requires some system of communication, especially if the plans of the hunters are to be flexible enough to allow them to adapt to changing conditions of the chase” – clearly a context that would favor the development of a silent communication system that can be used over larger distances. Hunting, however, is certainly not the most important motivation for sign language use. Rather, NCDSLs are used most extensively in circumstances in which speech is avoided for reasons of social ritual (also see Meggitt 1954). As for the North Central Desert area, Kendon (1989) identifies two important ritual contexts for sign language use: (i) male initiation and, more importantly, (ii) mourning.

At about 13 years of age, a boy is taken into seclusion by his sister’s husband and an older brother. After some initial ceremonies, he is taken on a journey, which may last two or three months, during which he learns about the topography of the region and acquires hunting skills. Following the journey, the boy undergoes circumcision and after he has been circumcised, he goes into seclusion again for another two to three months. During the first period of seclusion until after the circumcision, the boy is enjoined to remain silent. As pointed out by Meggitt (1975, 4), “novices during initia-

tion ceremonies are ritually dead” and since dead people cannot speak, they should communicate only in signs. The extent to which a boy makes use of signs during that period, however, appears to vary. Finally, after circumcision, the boy is released from all communicative restriction in a special ceremony (Kendon 1989, 85 f.).




A more important factor motivating sign use, however, are ceremonies connected with death and burial. In all communities studied by Kendon, speech taboos are observed during periods of mourning following the death of a group member. The taboo, however, applies only to women – in some communities only to the widow, in others also to other female relatives of the deceased. Duration of the speech taboo varies depending on factors such as “closeness of the relative to the deceased [...] and the extent to which the death was expected” (Kendon 1989, 88) and may last up to one year (for widows). As in the case of male initiation, the taboo is lifted during a special ‘mouth opening’ ceremony.

Findings reported in Kendon (1984) suggest that WSL is not common knowledge for all members of the Yuendumu community. Rather, use of WSL was mostly confined to middle-aged and older women. This is probably due to the fact that the most important context for sign use, mourning, is restricted to women, as is also supported by the observation that women who experienced bereavement showed better knowledge of WSL. Meggitt (1954) also notes that women generally know and use more signs than men do, but he adds as an additional factor that the use of signs allows women to gossip about topics (such as actual and probable love affairs) that are not meant for the husband’s ears.


As for YSL, Cooke and Adone (1994, 3) point out that the language is used during hunting and in ceremonial contexts “where proximity to highly sacred objects demands quietness as a form of respect”; however, they do not mention mourning as a motivation for sign language use. Interestingly, they further suggest that in the past, YSL may have served as a lingua franca in extended family groups in which, due to compulsory exogamy, several spoken Yolngu languages were used (also see Warner 1937). Moreover, they point out that YSL is also used as a primary language by five deaf people (three of them children at the time) – a communicative function not mentioned by Kendon. Actually, the data reported in Cooke and Adone (1994) come from a conversation between a hearing and a deaf man (also see Kwek (1991) for use of sign language by and in communication with a deaf girl in Punmu, an Aboriginal settlement in the Western Desert region in Western Australia).


5.3.2. Lexicon and structure of Aboriginal sign languages

According to Kendon (1984), WSL has a large vocabulary. He recorded 1,200 signs and points out that the form of the majority of signs is derived from depictions of some aspect of their meaning, that is, they are iconic (see chapter 18 for discussion). Often, however, the original iconicity is weakened or lost (as also observed by Frishberg (1975) for ASL). Kendon (1989, 161) provides the example of the sign for ‘mother’, in which the fingertips of a spread hand tap the center of the chest twice. It may be tempting to analyze this form as making reference to the mother’s breasts, but clearly this form “is not in any sense an adequate depiction of a mother’s breast”. Kendon

describes various strategies for sign creation, such as presenting (e.g. RDAKA ‘hand’: one hand moves toward the signer while in contact with the other hand), pointing (e.g. LANGA ‘ear’: tip of -hand touches ear), and characterizing (e.g. NGAYA ‘cat’: -hand represents the arrangement of a cat’s paw pads). Often, characterizing signs cannot be understood without knowledge about certain customs. In the sign for ‘fully initiated man’, for instance, the -hand is moved rapidly across the upper chest representing the horizontal raised scars that are typical for fully initiated men (Kendon 1989, 164).




Interestingly, there are also signs that are motivated by phonetic characteristics of the spoken language. For instance, the Warlpiri word *jija* may mean ‘shoulder’ and ‘medical sister’ (the latter resulting from an assimilation of the English word *sister*). Given this homophony, the WSL sign for ‘shoulder’ (tapping the ipsilateral shoulder with the middle finger) is also used for ‘medical sister’ (Kendon 1989, 195). Similarly, in YSL, the same sign (i.e. touching the bent elbow) is used for ‘elbow’ and ‘bay’ because in Djambarrpuyngu, one of the dominant Yolngu languages, the term *likan* has both these meanings (Cooke/Adone 1994).

Compounds are frequent in NCDSLs, but according to Kendon, almost all of them are loans from spoken languages. That is, in almost all cases where a meaning is expressed by a compound sign, the same compound structure is also found in the surrounding spoken language. Fusion (i.e. reduction and/or assimilation) of the parts is only occasionally observed; usually the parts retain their phonological identity. For instance, in Anmatyerre, we find the compound *kwatyeperre* (‘lightning’), which is composed of *kwatye* (‘water’) and *perre* (‘tail’); in the sign language, the same meaning is also expressed by the signs for ‘water’ and ‘tail’ (Kendon 1989, 207). An example of a native compound is the sign for ‘heron’, which combines the signs for ‘neck’ (a pointing sign) and ‘tall’ (upward movement of ), yielding a descriptive compound that can be glossed as ‘neck long’ (the corresponding Warlpiri word *kalwa* is monomorphemic). See Kendon (1989, 212–217) for discussion of Warlpiri preverb constructions, such as *jaala ya-ni* (‘go back and forth’) that are rendered as two-part signs in WSL.

Reduplication is a common morphological process in Australian languages, and it is also attested in the sign languages examined. As for nominal plurals, Kendon (1989, 202f.) finds that nouns that are pluralized by means of reduplication in Warlpiri (especially nouns referring to humans, such as *kurdu* ‘child’) are also reduplicated in WSL (e.g. KURDU++), while signs that are pluralized by the addition of a suffix (*-panu/-patu*) are pluralized in WSL by the addition of a quantity sign (-hand, palm toward signer, fingers moving back and forth). Cooke and Adone (1994) further report that reduplication is also used to mark iterativity on process verbs in YSL – again similar to what is observed in the surrounding spoken language (for pluralization, see also Pfau/Steinbach (2006) and chapter 6). It has to be pointed out, however, that the use of reduplication is not necessarily proof of borrowing, because reduplication appears to be a common feature in all sign languages studied to date – irrespective of the presence of this feature in the surrounding spoken language.

For WSL, Kendon (1989, 243f.) notes a distinction between directional and plain verbs (where the category ‘directional’ seems to include agreeing and spatial verbs; Padden 1988). Among the verbs that can agree with spatial locations by means of movement are WAPAMI (‘move’), YANI (‘go’), YINYI (‘give’), and KIJIRNI (‘throw’); other verbs, such as WANGKAMI (‘talk’) and NGARNI (‘ingest’), only change their orientation.

Interestingly, in the context of plain verbs, a dedicated ‘direction marker’, a directional pointing sign, can be added. This sign is reminiscent of indexical agreement auxiliaries described for various sign languages (see chapter 10 for discussion).

Kendon (1989) also discusses a number of ‘suffix markers’, that is, signs which he takes to be the sign equivalent of nominal suffixes – case markers and derivational suffixes – of the surrounding spoken languages. Amongst these WSL markers are: (i) ‘-hand pronation’, which may function as a possessive or associative marker; the latter is glossed as KURLU (based on Warlpiri) in (7a) (Kendon 1989, 230); (ii) ‘-hand pronation’, which expresses different types of negative meanings; and (iii) a two-handed sign expressing a meaning which in Warlpiri would be realized by the (causal) ablative (ABL) suffix *-ngurlu*: the base hand has a -handshape, palm oriented upwards, the dominant hand forms a fist, which is in contact with the palm of the base hand and is moved toward the signer by flexion of the wrist. In (7b) this sign is used in order to express that the woman is the cause of the man’s dissatisfaction (Kendon 1989, 233).

- (7) a. WATI MALIKI KURLU [WSL]
 man dog ASSOCIATIVE
 ‘the man with the dog’
- b. WURNA KARNTA NGURLU RDINYIRLPA JINTA PARNKAMIRRA
 travel woman ABL dissatisfied the.one runs.thither
 ‘He travelled thither (to the creek) dissatisfied because of the woman.’

Still, most of the numerous Warlpiri suffixes have no sign equivalent. Kendon (1989, 237) stresses that the WSL inventory of suffix markers includes only suffixes “that make differences that a recipient could not be left to settle on the basis of context”.

In many Australian spoken languages, including Warlpiri (Hale 1983), a rich case marking system goes hand in hand with a highly flexible word order. Given that most of these case-markers are absent in NCDSLs, one might expect that word order in the sign languages would be more constrained. However, based on a comparison of signed and spoken renditions of the same stories, Kendon (1988) concludes that there are no significant differences between the spoken and the signed versions. Rather, he finds a tendency for OV order in both the spoken and signed renditions, as illustrated in both clauses in (8a). Subjects are often omitted, but when they occur, they tend to be placed first.

The examples in (8) also illustrate parallels in terms of a match of signs to words (from Kendon (1988, 245); (8a) slightly adapted). The sign MANI (‘get’) in the first clause in (8a) is a plain verb. In the second clause, the same sign appears in a construction with a preverb, which roughly contributes the meaning ‘around neck’, thus yielding the meaning ‘carry on neck’. This is similar to the Warlpiri expression (preverb+root) *nyurdi ma-ni* meaning ‘to carry meat round the neck’ (8b). Kendon stresses that MANI in the second clause in (8a) does not contribute to the semantics; the meaning might as well have been expressed by NYURDI alone. Still, the signer employs the complex expression in order to match the signed expression to the structure of the spoken language. Kendon further notes that both examples contain a ‘directional clitic’: both the clitic *-rra* in (8b), which attaches to the preverb, and the pointing sign in (8a), which combines with the verb, indicate the direction in which the man moved.

5.4.1. On the origin and use of Plains Indian Sign Language

PISL (also referred to as North American Indian Sign Language or just “hand talk”) was used throughout the Great Plains, an area centrally located on the North American continent and covering approximately one million square miles, as well as in the neighboring Northern Plateau area. A map provided by Taylor (1975, 227) indicates that the sign language was used from Saskatchewan (Canada) in the North (e.g. Plains Cree tribe) to Texas in the South (e.g. Comanche) and from Montana in the West (e.g. Nez Perce) to Missouri in the East (e.g. Osage) (also see Davis 2010, 10). In both east-west and north-south directions, the most widely separated points are at a distance of 1,000 miles from each other.

The earliest descriptions of Indians signing were written by Álvaro Núñez Cabeza de Vaca in 1542 (Bonvillian/Ingram/McCleary 2009). The origins of PISL remain uncertain but it seems likely “that signed communication was already used among indigenous peoples across the North American continent prior to European contact” (Davis 2010, 19; also see Wurtzburg/Campbell 1995). Various scholars suggest that the sign language originated in the Gulf Coast region of Western Louisiana and Texas (Goddard 1979; Wurtzburg/Campbell 1995), from where it spread northward, trade being “the principal agent for the diffusion of the sign language throughout the Plains during the 19th century” (Taylor 1975, 225).

However, not all Plains Indian tribes used the sign language. Referring to earlier studies, Taylor (1975) reports that the largest number of users were located in the Central Plains and that the Crows (Manitoba), Cheyennes (Manitoba and South Dakota), and Blackfeet (Alberta and Saskatchewan) were regarded as the most proficient sign users (see Davis (2010, 7f.) for an overview of tribes who used sign language, together with sources of historical and current documentation). Apparently, adult men have been the primary (or at least most visible) users of the sign language, probably due to their more prominent role in public life. This, however, does not imply that women were forbidden knowledge and use of the sign language. Mallery (2001 [1881], 391) remarks that Cheyenne, Kiowa, and Comanche women knew and practiced the sign language and that, in fact, the Comanche women were “the peers of any sign talkers”. He even reports the assertion that the signs used by males and females were different, though mutually intelligible. It is important to point out that sign use was not restricted to situations in which the interlocutors had no language in common but was also observed between members of the same tribe. According to Taylor (1975, 229), “the sign language was, and is, regarded as an additional communications channel, in no way subordinated to the vocal-auditory”. Within tribes, purposes of sign use include public entertainment (e.g. storytelling, the Cheyenne “sign dance”), oratory, ritual practices, and activities, such as hunting, which require silence (Taylor 1975; Davis 2005).

While it seems clear that the primary function of PISL was that of an alternative to spoken language, the signed language was also acquired natively and signed fluently by both deaf and hearing members of native communities. Deaf tribal members played a vital role in the development and transmission of the language – a fact that clearly distinguishes PISL from other secondary sign languages. In fact, based on the acquisition pattern and the observation that PISL fulfills a wide variety of discourse functions, Davis (2010, 180–182) concludes that classifying PISL as a secondary language is not justified. This conclusion is further corroborated by the linguistic features of PISL described in the next section.

According to some authors (Davis 2005, 2010; Farnell 1995), PISL is still being learned today within some native groups and used in, for instance, traditional storytelling and rituals. The number of (native) users, however, has decreased dramatically. On the one hand, English has long taken over the role of a lingua franca amongst hearing Indians; on the other hand, most of the deaf members of native groups now attend schools for the deaf, where they learn ASL as a primary language (Davis 2010). The extant number of PISL users is unknown.

5.4.2. Lexicon and structure of Plains Indian Sign Language

Davis (2010, chapter 8) offers an extensive description of linguistic properties of PISL. Here, I can only touch on some selected aspects of the lexicon and structure of the language (see <http://pislresearch.com/>, developed and maintained by Jeffrey Davis, for further information as well as film clips and illustrations documenting PISL). Mallery (2001 [1881]) and Tomkins (1969 [1931]) provide dictionaries of PISL (see Davis (2007, 2010) for a lexical comparison of different varieties of PISL and of PISL and early 20th century ASL). What is remarkable about Mallery's collection is that it also includes signs for different tribes (e.g. CHEYENNE) and proper names (e.g. SPOTTED-TAIL, a Dakota chief), a list of common phrases, and even stories and dialogues. For the sake of illustration, consider the following excerpt of a conversation between Tendoy, chief of the Shoshoni Indians (Idaho), and Huerito, an Apache chief of New Mexico, which took place in Washington in April 1880 (adapted from Mallery (2001 [1881], 486–490) to comply with the conventions used in this handbook). The two Indians did not speak each other's language and had never met before that occasion.

- (9) H: Q-FORM [PISL]
 'Who are you?'
 T: SHOSHONI CHIEF
 'I am the chief of the Shoshoni.'
 H: WINTER HOW-MANY
 'How old are you?'
 T: FIFTY SIX
 'Fifty-six (years).'
 H: GOOD(intensive), BUFFALO COUNTRY INDEX₂
 'Very well. Are there any buffalo in your country?'
 T: YES, BUFFALO BLACK MANY [...] [PISL]
 'Yes, there are many black buffalos.'
 T: NIGHT+ INDEX₂ GO-TO(south)_{3a} YOUR-COUNTRY_{3a},
 INDEX₁ GO-TO(north)_{3b} MY-COUNTRY_{3b} RAIN DEEP MUCH
 SEE-EACH-OTHER NO-MORE
 'In two days, you go to your country and I go to my country, where there is a lot of snow, and we shall see each other no more.'

From this short excerpt, it is clear that, apart from content signs, the PISL lexicon contains question words (including the general question sign Q-FORM), pronouns, numerals, quantifiers, and negation. Davis (2010, 144) adds that PISL makes use of (head-

initial) compounds such as WHITE-MAN[^]SOLDIER[^]CHIEF ('white officer') and MAN[^]MARRY[^]NO ('bachelor'). Mallery's extensive study includes a comparison of PISL signs to gestures (e.g. Ancient Greek and Neapolitan gestures) and to the signs used by "deaf-mutes" in the United States. Moreover, he examines the origin and iconic motivation of signs based on pictographs and ethnologic facts (the sign for FRIEND, for instance, being derived from the meaning 'we two smoke together').

With respect to the grammatical structure of PISL, Mallery argues that "there is in the gesture speech no organized sentence such as is integrated in the languages of civilization" and that one "must not look for articles or particles or passive voice or case [...] or even what appears in those languages as a substantive or a verb. The sign radicals, without being specifically any of our parts of speech, may be all of them in turn" (Mallery 2001 [1881], 359). Also, he mentions the absence of a copula verb and the lack of tense inflection. It is by now well-known, of course, that all of these characteristics are also fairly common in typologically diverse spoken languages and natural sign languages.

In this context, it is rather interesting that Mallery notes that signs tend to be arranged in a fixed order (e.g. the object preceding the verb) – an observation which contradicts his above claim that there is "no organized sentence" (also see Kroeber (1958) for sign order within compounds and utterances). He describes the example in (10a) and points out that both the Indians and deaf signers would convey this utterance in the same way (Mallery 2001 [1881], 361). Clearly, this is exactly how a similar structure would be realized in many sign languages, for which signs like DONE have been analyzed as completive or perfective markers (see chapter 9 for discussion). Davis (2010) concludes that PISL has basic SOV order, although other orders are attested (including structures involving null arguments and topicalization); he provides the example in (10b) (Davis 2010, 154; example slightly adapted). It is noteworthy that SOV is also the most common word order in the ambient spoken languages (although it has been claimed that some of these languages have flexible word order). Kroeber (1958) thus concludes that PISL syntax is based directly on spoken language.

- (10) a. SLEEP DONE, INDEX₁ RIVER GO-TO [PISL]
 'When I have had a sleep, I will go to the river.'
- b. INDEX_{3(left)} INDEX_{3(right)} WEAPONS WAR-BONNET EXCHANGE
 'They (he and he) exchange weapons and war bonnets.'
- c. SIOUX SAY [WHITE-MAN[^]SOLDIER[^]CHIEF BRAVE ABOVE-ALL
 [SIOUX _ FIGHT]]
 'The Sioux say (that) the officer is the bravest (that) the Sioux
 have ever fought.'

As for syntactic structure, Davis (2010, 159) further argues that recursion is attested in PISL and illustrates his claim with the example in (10c), which supposedly contains a sentential complement and a relative clause (the underscore indicating the position in which the head noun 'officer', which is the object of 'fight', is interpreted).

In addition, Mallery observes that "relations of ideas and objects are [...] expressed by placement. The sign talker is an artist, grouping persons and things so as to show the relations between them, [...] his scenes move and act, are localized and animated" (p. 360). That is, signers make use of the signing space. From the examples he discusses,

it appears as if locations are not used for arbitrary reference, such as establishing loci for non-present referents. Taylor (1975, 235) explicitly states that “when someone not present is referred to, an appropriate noun must be used” (see Davis (2010, 151) for discussion of PISL pronouns). Also, example (9) suggests that signers use an absolute frame of reference. Note that the spatial verb GO-TO is signed once toward the north (relative position of Idaho) and once toward the south (relative position of New Mexico). Finally, in one of Mallery’s examples, we come across a possible instance of an agreeing verb: apparently, the movement of TALK (forward movement from the chin) can be reversed to express the meaning ‘he talked to me’. Davis (2010, 148) provides additional examples of spatial (locative) verbs (e.g. BRING, COME) and agreeing (indicating) verbs (e.g. SEE; also note the reciprocal form SEE-EACH-OTHER in (9)).

Finally, from Mallery’s detailed description of dialogues, we can infer that non-manual interrogative marking exists: in one example, the sequence HEAR INDEX₂ is accompanied by “a look of inquiry” (p. 492) to express the meaning “Did you hear of it?” In addition, a manual interrogative marker (viz. the sign Q-FORM in (9)), which precedes and follows the interrogative clause, is commonly used. Davis (2010, 164) points out that, depending on the context, this marker can fulfill the function of a wh-word, of a question particle (in yes/no-questions), or of a discourse opener.

Based on these characteristics, as well as the sociolinguistic properties described above, it seems safe to conclude that PISL is more than just “gesture talk”. Rather, it shows many of the properties characteristic of natural sign languages. It is multi-generational, cross-cultural, non-emergent, highly conventionalized, and has a high status (cf. the comparative chart provided by Davis (2010, 183), where PISL is compared to Deaf community sign languages, Aboriginal sign languages, Nicaraguan Sign Language, and homesign, among others). Davis thus concludes that the label ‘secondary sign language’ is inappropriate because “a particular signed language (PISL in this case) can potentially serve in both primary and alternate capacities” (Davis 2010, 186). Consequently, PISL might be more similar to some village sign languages than to secondary types (personal communication).

5.5. Summary

In this section, I have provided sketches of the origin, use, and structure of four secondary sign languages. The discussion reveals that these sign languages developed for various reasons (ritual/taboo, noise, as lingua franca); it further suggests that the four sign languages are of varying grammatical complexity. Table 23.1 is an attempt to take stock of some of the linguistic features of these secondary languages, based on the information available in the respective sources. Three aspects of grammar are included in the comparison – compounding, (spatial) agreement, and the realization of interrogatives. In addition, the influence from the surrounding spoken language is evaluated.

We may conclude – albeit with some caution – that Sawmill Sign Language and CisSL show the simplest grammatical structure as well as a strong influence from the surrounding spoken language. CisSL, however, appears to have a richer lexicon and more complex word formation strategies. Influence of the spoken language is also strong in NCDSLs. Yet, this group of sign languages also displays some features that are characteristic of natural sign languages. In addition, it is clear from Kendon’s de-

Tab. 23.1 Comparison of selected linguistic features of secondary sign languages

	compounding	(spatial) agreement	interrogatives	influence from spoken language
Sawmill SL	– mostly E-b – no PR/A	NO	– no sim. NMM ^a – only one G-QS, sentence-initial	STRONG – mouthing – audiomimic signs – compounds – word order
Cistercian SL	– mostly E-b – no PR/A – may incl. MA	NO	– no sim. NMM ^a – QM in air – only one G-QS, sentence-initial	STRONG – audiomimic signs – MA in compounds – MA for copula – word order
North Central Desert SLs ^b	– mostly loans – no P/RA	YES	– no sim. NMM – no information on question sign	STRONG – mouthing – compounds – reduplication ^c – suffix markers – word order
Plains Indian SL	– few loans from spoken lang. – no PR/A	YES	– sim. NMM – one G-QS; sentence-initial and/or -final – additional QS?	WEAK – few compounds – word order (?)

^a A non-manual marker may precede the interrogative clause.

^b Only facts for NCDSLs are reported in the table. According to Cooke and Adone (1994), YSL differs from NCDSLs in a number of respects (e.g. influence of surrounding spoken language).

^c Reduplication is included here not because it is attested in both the spoken and the sign languages, but because it only applies to nouns which are also pluralized by means of reduplication in the spoken language.

Abbreviations: E-b = English-based; G-QS = general question (wh-) sign; MA = manual alphabet; NMM = non-manual markers; PR/A = phonological reduction and/or assimilation (characteristic of sign language compounds); QM = question mark (preceding the question); QS = question sign; sim. = simultaneous; SL = sign language.

scriptions that NCDSLs allow for complex communicative interaction (including storytelling). Finally, PISL exhibits most linguistic features and shows only little influence from surrounding spoken languages – which is not surprising given that it was originally used as a lingua franca between speakers of different languages. Once again, I want to stress that it is therefore highly problematic to classify PISL as a secondary sign language.

As for the present-day use of these communicative systems, it seems likely that Sawmill Sign Language is now extinct. Whether CisSL (or other monastic sign languages) are still used is unclear; however, given that monastic orders in which a law of silence is imposed still exist, it is not improbable that the sign language is still used. At least PISL and different Aboriginal sign languages are still in use, but PISL has lost its function as a lingua franca.

6. Conclusion

Manual communication systems exist in many different forms of varying complexity. At the one end of the continuum, we find gestural codes that are only used in highly specific contexts such as certain professions (e.g. crane driving, aviation, auctions) or situations (e.g. diving, hunting); these codes typically have a very limited lexicon and lack syntactic structure. At the other end, natural sign languages are situated, which are adequate for all communicative purposes and are characterized by rich lexicons and complex grammatical structure on all levels of linguistic description.

Interestingly, more complex systems may evolve from simpler ones. It has been suggested that such a development may have played a key role in the phylogeny of language, when gestural protolanguage – presumably a conglomerate of iconic gestures – evolved into ‘proto-sign’, which in turn may have been the basis for the evolution of spoken language (remember, however, that alternative evolutionary scenarios exist). In any case, such a development would probably have taken centuries if not millennia. However, other developments along a continuum of complexity, which took much less time, are attested, such as, for instance, the development of Sawmill Sign Language from an originally purely technical manual code and the emergence of Nicaraguan Sign Language from homesign.

Finally, the discussion also revealed that considerable variation exists even within the most complex group of manual communication systems, the natural sign languages. On the one hand, this variation may result from differences in sociolinguistic setting (e.g. village sign languages) and context of use (e.g. tactile sign languages). On the other hand, the attested grammatical variation reflects well-known typological patterns known from the study of spoken languages. Surely, as more (types of) sign languages enter the stage of sign language linguistics, we will learn more about the potentials and limits of human languages, as well as about their evolution.

Acknowledgements: I am particularly grateful to Dany Adone and Jeffrey Davis for helpful comments on parts of this chapter. Moreover, I am indebted to Dany Adone, Anastasia Bauer, and Dan Slobin for providing invaluable information. Work on this chapter was supported by the German Science Foundation (DFG) in the framework of the *Lichtenberg-Kolleg* at the Georg-August-University, Göttingen.

7. Literature

Adone, Dany

2002 *On the Use of Non-manuals in an Alternate Sign Language*. Manuscript, University of Düsseldorf.

Aitken, Stuart

2000 Understanding Deafblindness. In: Aitken, Stuart/Buultjens, Marianna/Clark, Catherine/Eyre, Jane T./Pease, Laura (eds.), *Teaching Children Who Are Deafblind: Contact, Communication and Learning*. London: Fulton Publishers, 1–34.

Arbib, Michael A.

2005 From Monkey-like Action Recognition to Human Language: An Evolutionary Framework for Neurolinguistics. In: *Behavioral and Brain Sciences* 28, 105–167.

- Armstrong, David F./Wilcox, Sherman
 2003 Origins of Sign Languages. In: Marschark, Marc/Spencer, Patricia E. (eds.), *Oxford Handbook of Deaf Studies, Language, and Education*. Oxford: Oxford University Press, 305–318.
- Armstrong, David F./Wilcox, Sherman
 2007 *The Gestural Origin of Language*. Oxford: Oxford University Press.
- Aronoff, Mark/Meir, Irit/Sandler, Wendy
 2005 The Paradox of Sign Language Morphology. In: *Language* 81(2), 301–344.
- Baker, Charlotte
 1977 Regulators and Turn-taking in American Sign Language. In: Friedman, Lynn A. (ed.), *On the Other Hand: New Perspectives on American Sign Language*. New York: Academic Press, 215–236.
- Balder, Anneke/Bosman, Irma/Roets, Lieve/Schermer, Trude/Stiekema, Ton
 2000 *Over Doofblindheid. Communicatie en Omgang*. Utrecht: HvU, Seminarium voor Orthopedagogiek.
- Barakat, Robert A.
 1975 Cistercian Sign Language. In: Umiker-Sebeok, Jean/Sebeok, Thomas A. (eds.) (1987), *Monastic Sign Languages*. Berlin: Mouton de Gruyter, 67–322.
- Benedict of Nursia
 1949 *The Holy Rule of St. Benedict* (1949 Edition; Translated by Rev. Boniface Verheyen). [Available from: <http://www.e-benedictine.com/go/index.php?page=3>; Accessed on 3 November 2011].
- Bickerton, Derek
 2003 Symbol and Structure: A Comprehensive Framework for Language Evolution. In: Christiansen, Morten/Kirby, Simon (eds.), *Language Evolution*. Oxford: Oxford University Press, 77–94.
- Bonvillian, John D./Ingram, Vicky L./McCleary, Brendan M.
 2009 Observations on the Use of Manual Signs and Gestures in the Communicative Interactions Between Native Americans and Spanish Explorers of North America: The Accounts of Bernal Díaz del Castillo and Álvaro Núñez Cabeza de Vaca. In: *Sign Language Studies* 9(2), 132–165.
- Bouchard, Denis
 1997 Sign Languages and Language Universals: The Status of Order and Position in Grammar. In: *Sign Language Studies* 91, 101–160.
- Bruce, Scott G.
 2007 *Silence and Sign Language in Medieval Monasticism. The Cluniac Tradition c. 900–1200*. Cambridge: Cambridge University Press.
- Buysens, Eric
 1956 Le Langage par Gestes chez les Moines. In: Umiker-Sebeok, Jean/Sebeok, Thomas A. (eds.) (1987), *Monastic Sign Languages*. Berlin: Mouton de Gruyter, 29–37.
- Cecchetto, Carlo/Cecchetto, Alessandra/Geraci, Carlo/Guasti, Maria Teresa
 2010 Making up for the Disappearance of Non-manual Marking in Tactile Sign Languages. Poster Presented at 10th Conference on Theoretical Issues in Sign Language Research (TISLR 10), West Lafayette, IN, October 2010.
- Collins, Steven
 2004 *Adverbial Morphemes in Tactile American Sign Language*. PhD Dissertation, Union Institute and University, Cincinnati.
- Collins, Steven/Petronio, Karen
 1998 What Happens in Tactile ASL? In: Lucas, Ceil (ed.), *Pinky Extension and Eye Gaze: Language Use in Deaf Communities*. Washington, DC: Gallaudet University Press, 18–37.
- Comrie, Bernard
 1989 *Language Universals and Linguistic Typology* (2nd Edition). Chicago: University of Chicago Press.

- Cooke, Michael/Adone, Dany
1994 Yolngu Signing – Gestures or Language? *CALL Working Papers*, Centre for Aboriginal Languages and Linguistics, Batchelor College, Northern Territory, Australia.
- Corballis, Michael C.
2003 From Hand to Mouth: The Gestural Origins of Language. In: Christiansen, Morten/Kirby, Simon (eds.), *Language Evolution*. Oxford: Oxford University Press, 201–218.
- Corballis, Michael C.
2010 The Gestural Origins of Language. *WIREs Cognitive Science* 1(1) [<http://wires.wiley.com/cogsci>].
- Corbett, Greville G.
2006 *Agreement*. Cambridge: Cambridge University Press.
- Crystal, David/Craig, Elma
1987 Contrived Sign Language. In: Schlesinger, Izchak M./Namir, Lila (eds.), *Sign Language of the Deaf: Psychological, Linguistic, and Sociological Perspectives*. New York: Academic Press, 141–168.
- Davis, Jeffrey
2005 Evidence of a Historical Signed Lingua Franca Among North American Indians. In: *Deaf Worlds* 21(3), 47–72.
- Davis, Jeffrey
2006 A Historical Linguistic Account of Sign Language Among North American Indians. In: Lucas, Ceil (ed.), *Multilingualism and Sign Languages. From the Great Plains to Australia*. Washington, DC: Gallaudet University Press, 3–35.
- Davis, Jeffrey
2007 North American Indian Signed Language Varieties: A Comparative Historical Linguistic Assessment. In: Quinto-Pozos, David (ed.), *Sign Languages in Contact*. Washington, DC: Gallaudet University Press, 85–122.
- Davis, Jeffrey
2010 *Hand Talk: Sign Language Among American Indian Nations*. Cambridge: Cambridge University Press.
- Divale, William T./Zipin, Clifford
1977 Hunting and the Development of Sign Language: A Cross-cultural Test. In: *Journal of Anthropological Research* 33, 185–201.
- Doupe, Allison J./Kuhl, Patricia K.
1999 Birdsong and Human Speech: Common Themes and Mechanisms. In: *Annual Review of Neuroscience* 22, 567–631.
- Dryer, Matthew S.
2007 Word Order. In: Shopen, Timothy (ed.), *Language Typology and Syntactic Description. Vol. I: Clause Structure* (2nd Edition). Cambridge: Cambridge University Press, 61–131.
- Dryer, Matthew S.
2011 Order of Subject, Object and Verb. In: Dryer, Matthew S./Haspelmath, Martin (eds.), *The World Atlas of Language Structures Online*. Munich: Max Planck Digital Library, chapter 81 [Available at: <http://wals.info/chapter/81>; Accessed on 18 November 2011].
- Farnell, Brenda M.
1995 *Do You See What I Mean? Plains Indian Sign Talk and the Embodiment of Action*. Austin, TX: University of Texas Press.
- Fitch, W. Tecumseh
2002 Comparative Vocal Production and the Evolution of Speech: Reinterpreting the Descent of the Larynx. In: Wray, Alison (ed.), *The Transition to Language. Studies in the Evolution of Language*. Oxford: Oxford University Press, 21–45.
- Fitch, W. Tecumseh
2005 The Evolution of Language: A Comparative Review. In: *Biology and Philosophy* 20, 193–230.

- Fitch, W. Tecumseh
2006 The Biology and Evolution of Music: A Comparative Perspective. In: *Cognition* 100(1), 173–215.
- Fitch, W. Tecumseh
2010 *The Evolution of Language*. Cambridge: Cambridge University Press.
- Frankel, Mindy A.
2002 Deaf-blind Interpreting: Interpreters' Use of Negation in Tactile American Sign Language. In: *Sign Language Studies* 2(2), 169–181.
- Frishberg, Nancy
1975 Arbitrariness and Iconicity: Historical Change in American Sign Language. In: *Language* 51, 696–719.
- Gardner, R. Allen/Gardner, Beatrix T./van Cantfort, Thomas E. (eds.)
1989 *Teaching Sign Language to Chimpanzees*. Albany, NY: State University of New York Press.
- Goddard, Ives
1979 The Languages of South Texas and the Lower Rio Grande. In: Campbell, Lyle/Mithun, Marianne (eds.), *The Languages of Native America: Historical and Comparative Assessment*. Austin, TX: University of Texas Press, 355–389.
- Goldin-Meadow, Susan
2003 *The Resilience of Language. What Gesture Creation in Deaf Children Can Tell Us About How All Children Learn Language*. New York: Psychology Press.
- Hale, Ken
1983 Warlpiri and the Grammar of Non-configurational Languages. In: *Natural Language and Linguistic Theory* 1, 5–47.
- Hewes, Gordon W.
1973 Primate Communication and the Gestural Origins of Language. In: *Current Anthropology* 14, 5–24.
- Hewes, Gordon W.
1978 The Phylogeny of Sign Language. In: Schlesinger, Izchak M./Namir, Lila (eds.), *Sign Language of the Deaf: Psychological, Linguistic, and Sociological Perspectives*. New York: Academic Press, 11–56.
- Jackendoff, Ray
1999 Possible Stages in the Evolution of the Language Capacity. In: *Trends in Cognitive Science* 3(7), 272–279.
- Johnson, Robert E.
1977 An Extension of Oregon Sawmill Sign Language. In: *Current Anthropology* 18(2), 353–354.
- Kegl, Judy/Senghas, Ann/Coppola, Marie
1999 Creation through Contact: Sign Language Emergence and Sign Language Change in Nicaragua. In: DeGraff, Michel (ed.), *Language Creation and Language Change: Creolization, Diachrony, and Development*. Cambridge, MA: MIT Press, 179–237.
- Kendon, Adam
1984 Knowledge of Sign Language in an Australian Aboriginal Community. In: *Journal of Anthropological Research* 40, 556–576.
- Kendon, Adam
1988 Parallels and Divergences between Warlpiri Sign Language and Spoken Warlpiri: Analyses of Signed and Spoken Discourse. In: *Oceania* 58(4), 239–254.
- Kendon, Adam
1989 *Sign Languages of Aboriginal Australia: Cultural, Semiotic and Communicative Perspectives*. Cambridge: Cambridge University Press.
- Kendon, Adam
2004 *Gesture: Visible Action as Utterance*. Cambridge: Cambridge University Press.

- Kimmelman, Vadim
2012 Word Order in Russian Sign Language: An Extended Report. In: *Linguistics in Amsterdam* 5, 1–56 [http://www.linguisticsinamsterdam.nl/].
- Klima, Edward/Bellugi, Ursula
1979 *The Signs of Language*. Cambridge, MA: Harvard University Press.
- Kroeber, Alfred L.
1958 Sign Language Inquiry. In: *International Journal of American Linguistics* 24(1), 1–19.
- Kusters, Wouter
2003 *Linguistic Complexity: The Influence of Social Change on Verbal Inflection*. PhD Dissertation, University of Leiden. Utrecht: LOT.
- Kwek, Joan
1991 Occasions for Sign Use in an Australian Aboriginal Community. In: *Sign Language Studies* 71, 143–160.
- Lewis, Jerome
2009 As Well as Words: Congo Pygmy Hunting, Mimicry, and Play. In: Botha, Rudolf/Knight, Chris (eds.), *The Cradle of Language*. Oxford: Oxford University Press, 236–256.
- Lewontin, Richard C.
1998 The Evolution of Cognition: Questions We Will Never Answer. In: Scarborough, Dan/Sternberg, Saul (eds.), *An Invitation to Cognitive Science (2nd Edition)*. Vol. 4: *Methods, Models, and Conceptual Issues*. Cambridge, MA: MIT Press, 107–132.
- Liddell, Scott K.
1980 *American Sign Language Syntax*. The Hague: Mouton.
- Lieberman, Philip
1984 *The Biology and Evolution of Language*. Cambridge, MA: Harvard University Press.
- Lillo-Martin, Diane/Meier, Richard P.
2011 On the Linguistic Status of ‘Agreement’ in Sign Languages. In: *Theoretical Linguistics* 37, 95–141.
- Lupyan, Gary/Dale, Rick
2010 Language Structure is Partly Determined by Social Structure. In: *Public Library of Science ONE* 5(1), 1–10.
- MacDonald, Roderick J.
1994 Deaf-blindness: An Emerging Culture? In: Erting, Carol J./Johnson, Robert, C./Smith, Dorothy L./Snider, Bruce C. (eds.), *The Deaf Way: Perspectives from the International Conference on Deaf Culture*. Washington, DC: Gallaudet University Press, 496–503.
- MacNeilage, Peter F.
2008 *The Origin of Speech*. Oxford: Oxford University Press.
- Mallery, Garrick
2001 [1881] *Sign Language Among North American Indians*. Mineola, NY: Dover Publications.
- Marler, Peter
1997 Three Models of Song Learning: Evidence from Behavior. In: *Journal of Neurobiology* 33, 501–516.
- Marsaja, I Gede
2008 *Desa Kolok – A Deaf Village and Its Sign Language in Bali, Indonesia*. Nijmegen: Ishara Press.
- Meggitt, Mervyn J.
1954 Sign Language Among the Walbiri of Central Australia. In: *Oceania* 25, 2–16.
- Meir, Irit/Padden, Carol/Aronoff, Mark/Sandler, Wendy
2007 Body as Subject. In: *Journal of Linguistics* 43, 531–563.
- Meissner, Martin/Philpott, Stuart B.
1975a The Sign Language of Sawmill Workers in British Columbia. In: *Sign Language Studies* 9, 291–308.

- Meissner, Martin/Philpott, Stuart B.
1975b A Dictionary of Sawmill Workers' Signs. In: *Sign Language Studies* 9, 309–347.
- Mesch, Johanna
2001 *Tactile Sign Language: Turn Taking and Questions in Signed Conversations of Deaf-blind People*. Hamburg: Signum.
- Mithun, Marianne
1992 Is Basic Word Order Universal? In: Payne, Doris L. (ed.), *Pragmatics of Word Order Flexibility*. Amsterdam: Benjamins, 15–61.
- Okanoya, Kazuo
2002 Sexual Display as a Syntactical Vehicle: The Evolution of Syntax in Birdsong and Human Language through Sexual Selection. In: Wray, Alison (ed.), *The Transition to Language. Studies in the Evolution of Language*. Oxford: Oxford University Press, 46–63.
- Quinto-Pozos, David
2002 Deictic Points in the Visual-gestural and Tactile-gestural Modalities. In: Meier, Richard P./Cormier, Kearsy A./Quinto-Pozos, David G. (eds.), *Modality and Structure in Signed and Spoken Languages*. Cambridge: Cambridge University Press, 442–467.
- Padden, Carol
1988 *The Interaction of Morphology and Syntax in American Sign Language*. New York: Garland Publishing.
- Payne, John R.
1985 Negation. In: Shopen, Timothy (ed.), *Language Typology and Syntactic Description. Vol. 1: Clause Structure*. Cambridge: Cambridge University Press, 197–242.
- Perniss, Pamela/Pfau, Roland/Steinbach, Markus
2007 Can't You See the Difference? Sources of Variation in Sign Language Structure. In: Perniss, Pamela/Pfau, Roland/Steinbach, Markus (eds.), *Visible Variation: Comparative Studies on Sign Language Structure*. Berlin: Mouton de Gruyter, 1–34.
- Pfau, Roland
2008 The Grammar of Headshake: A Typological Perspective on German Sign Language Negation. In: *Linguistics in Amsterdam* 1, 37–74 [<http://www.linguisticsinamsterdam.nl/>].
- Pfau, Roland/Steinbach, Markus
2006 Pluralization in Sign and in Speech: A Cross-modal Typological Study. In: *Linguistic Typology* 10, 135–182.
- Reed, Charlotte M./Delhorne, Lorraine A./Durlach, Nathaniel I./Fischer, Susan D.
1995 A Study of the Tactile Reception of Sign Language. In: *Journal of Speech and Hearing Research* 38, 477–489.
- Rijnberk, Gérard van
1953 Le Langage par Signes chez les Moines. In: Umiker-Sebeok, Jean/Sebeok, Thomas A. (eds.) (1987), *Monastic Sign Languages*. Berlin: Mouton de Gruyter, 13–25.
- Rizzolatti, Giacomo/Arbib, Michael A.
1998 Language Within Our Grasp. In: *Trends in Neuroscience* 21, 188–194.
- Schick, Brenda
2003 The Development of ASL and Manually-Coded English Systems. In: Marschark, Marc/Spencer, Patricia (eds.), *Oxford Handbook of Deaf Studies, Language, and Education*. New York: Oxford University Press, 219–231.
- Schuit, Joke
2007 *The Typological Classification of Sign Language Morphology*. MA Thesis, University of Amsterdam.
- Schuit, Joke/Baker, Anne/Pfau, Roland
2011 Inuit Sign Language: A Contribution to Sign Language Typology. In: *Linguistics in Amsterdam* 4, 1–31 [<http://www.linguisticsinamsterdam.nl/>].
- Schwartz, Sandrine
2009 *Stratégies de Synchronisation Interactionnelle – Alternance Conversationnelle et Rétroaction en Cours de Discours – Chez des Locuteurs Sourdaveugles Pratiquant la Langue des Signes Française Tactile*. PhD Dissertation, Université Paris 8.

Slobin, Dan I.

accepted Typology and Channel of Communication: Where Do Signed Languages Fit in? In: Bickel, Balthasar/Grenoble, Lenore/Peterson, David A./Timberlake, Alan (eds.), *What's Where Why? Language Typology and Historical Contingency: A Festschrift to Honor Johanna Nichols*.

Stokoe, William C.

1978 Sign Language and the Monastic Use of Lexical Gestures. In: *Semiotica* 24, 181–194.

Taylor, Allan R.

1975 Nonverbal Communication in Aboriginal North America: The Plains Sign Language. In: Umiker-Sebeok, Jean/Sebeok, Thomas A. (eds.) (1978), *Aboriginal Sign Languages of the Americas and Australia. Volume 2: The Americas and Australia*. New York: Plenum, 223–244.

Tomkins, William

1969 [1931] *Indian Sign Language*. New York: Dover Publications.

Vargha-Khadem, Faraneh/Watkins, Kate/Alcock, Katherine/Fletcher Paul/Passingham, Richard

1995 Praxic and Nonverbal Cognitive Deficits in a Large Family with a Genetically-transmitted Speech and Language Disorder. In: *Proceedings of the National Academy of Science* 92, 930–933.

Warner, W. Lloyd

1937 Murngin Sign Language. In: Umiker-Sebeok, Jean/Sebeok, Thomas A. (eds.) (1978), *Aboriginal Sign Languages of the Americas and Australia. Volume 2: The Americas and Australia*. New York: Plenum, 389–392.

Wilbur, Ronnie B.

2000 Phonological and Prosodic Layering of Nonmanuals in American Sign Language. In: Emmorey, Karen/Lane, Harlan (eds.), *The Signs of Language Revisited. An Anthology to Honor Ursula Bellugi and Edward Klima*. Mahwah, NJ: Lawrence Erlbaum, 213–244.

Wurtzburg, Susan/Campbell, Lyle

1995 North American Indian Sign Language: Evidence of Its Existence Before European Contact. In: *International Journal of American Linguistics* 61, 153–167.

Zeshan, Ulrike

2004 Hand, Head, and Face: Negative Constructions in Sign Languages. In: *Linguistic Typology* 8, 1–58.

Zeshan, Ulrike

2008 Roots, Leaves and Branches – The Typology of Sign Languages. In: Quadros, Ronice M. de (ed.), *Sign Languages: Spinning and Unraveling the Past, Present and Future. 45 Papers and 3 Posters from the 9th Theoretical Issues in Sign Language Research Conference*. Petrópolis: Editora Arara Azul, 671–695.

Roland Pfau, Amsterdam (The Netherlands)