Signs of the arctic: Typological aspects of Inuit Sign Language

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3. Semantic fields

Studies of spoken languages have revealed that interesting typological patterns exist in several semantic fields. Within a particular field, the number of terms and their distribution may differ from language to language, but it is still possible to find some universal tendencies and implicational hierarchies. As it is widely accepted that there is a relation between language, thought, and culture, these universals are of interest since they might give insights into human cognition. Grushkin (1998) describes this triangular relation as follows:

“Most anthropologists would agree that one can view culture as a development of a particular group’s “adaptation” to their environment. Within this view, the experiences of individuals and members of a group of these individuals give rise to specific ways of thought or being (culture), which are transmitted and shared through language.” (Grushkin 1998:144-5; emphases in original)

Not only are culture and language both influenced by the experiences of people, but the perception of these experiences is also influenced by the language and culture of the individuals or group (Whorf 1940). It is not my intention to evaluate linguistic relativity here, but only to point out that language, culture and thought are interrelated.

In this chapter, the kinship system, the colour terms, time reference and the number set of IUR are described. Kinship and colour were chosen because of the universal tendencies previously described for spoken languages, and since they have also been explored in some detail for a number of sign languages. Time and number terms are also well defined, although universal tendencies are not so obvious. Since descriptions of other sign languages include information about these fields (inter alia Nyst 2007; the EUROBabel Village Sign Project), they are described for IUR and compared. Currently a large typological sign language project is being undertaken by the International Institute for Sign Languages and Deaf Studies (iSLanDS Centre) at the University of Central Lancashire. With the description of the semantic fields in IUR, a contribution is made to their and other cross-linguistic studies.

The four semantic fields are described in separate sections: kinship (section 3.1), colour (section 3.2), time (section 3.3) and number (section 3.4). For each semantic field, previously identified universal tendencies and/or implicational hierarchies are first described, then the relevant Inuktitut terms, the data from other sign languages, and finally the IUR data. The Inuktitut terms are relevant in order to explore any possible influence on IUR from the surrounding culture and/or spoken language. Most IUR data in this chapter comes from the semi-spontaneous data\(^\text{10}\), although elicitation tasks were carried out with respect to kinship and colour (cf. chapter 1, section 1.3 Methodology).

\(^{10}\) It should be pointed out that the study regarding kinship and colour has mainly been undertaken in Rankin Inlet. Tasks meant to elicit kinship and colour terms have been conducted in Rankin Inlet in 2009 and 2010. I had planned to elicit comparative material from Baker Lake and Taloyoak in 2012, but due to circumstances in those communities, I was not able to visit the informants again.
3.1. Kinship terms
3.1.1. Universals and general properties in kinship terms

Greenberg (1966) looked for universals in the semantic field of kinship terminology. His approach was based on the concept of markedness, which he used to oppose two terms of a set, as for instance FATHER vs. MOTHER, or COUSIN vs. SIBLING. Greenberg (1966) defined ten criteria based on a definition of marking that entails that a marked category expresses a certain property overtly, while the unmarked does not. The unmarked term is thus simpler in form; it is also used more often, and has more subtypes than the marked form.

Greenberg established criteria for markedness and applied these to all aspects of language (for instance on phonology, syntax, lexicon). Not all of these criteria are relevant with respect to kinship, however. In the present context, two criteria are particularly relevant. First, unmarked kin terms have zero expression, that is, no overt marking. For example, where DAUGHTER is a combination of SON + FEMALE, DAUGHTER is marked but SON is unmarked since the masculine form has no overt marking. This pattern is observed in Wappo (an extinct Yuki language from the US): ek’a means ‘son’ and ek’abi (lit. son+feminine) means ‘daughter’ (Gifford 1922, in Hage 2001). Second, the unmarked term may also be used to refer to an entire category, for instance, using the term for SON also to refer to CHILD, as is the case in Spanish hijos ‘children’ (from hijo ‘son’). This also includes the facultative, overt expression of the marked category: a group of children that is referred to as hijos can include one or more girls, while hijas can never include boys.

Table 3.1: Greenberg’s markedness theory and hierarchies of categories (after Wilkinson 2009:58)

<table>
<thead>
<tr>
<th>Unmarked</th>
<th>Marked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consanguineal</td>
<td>&gt;</td>
</tr>
<tr>
<td>Ascending</td>
<td>&gt;</td>
</tr>
<tr>
<td>Lineal</td>
<td>&gt;</td>
</tr>
<tr>
<td>Less remote generation</td>
<td>&gt;</td>
</tr>
<tr>
<td></td>
<td>Affinal</td>
</tr>
<tr>
<td></td>
<td>Descending</td>
</tr>
<tr>
<td></td>
<td>Collateral</td>
</tr>
<tr>
<td></td>
<td>More remote generation</td>
</tr>
</tbody>
</table>

After having applied his markedness criteria to kinship terminology, Greenberg (1966) posited several hierarchies with respect to kinship universals, which can be summarised by stating that markedness increases with seniority and genealogical distance from Ego. To illustrate, the hierarchies are presented in Table 3.1. Consanguineal relatives are blood-

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11 Concepts within the semantic domains discussed in this chapter will be given in capital letters, in order to distinguish them from the English terms and the glosses for signs.
related, affinal relatives are relatives by marriage. Ascending kin are relatives at levels in the direct line above Ego, while descending kin are those at levels below Ego. Lineal kin are direct ascending or descending kin, while collateral kin are not.

For ascending and descending kin, Greenberg suggested an additional hierarchy, presented here in Figure 3.1, in which G stands for Generation. This hierarchy should be read as implicational, for example, if a language has terms that mark gender in GRANDFATHER and GRANDMOTHER (=G⁻²), the language should also have terms that mark gender in the terms for SON and DAUGHTER (=G⁻¹), BROTHER and SISTER (=G⁰), as well as FATHER and MOTHER (=G¹).

$$G^{+1} > G^0 > G^{-1} > G^{-2} > G^{-3} > G^{-4} > \ldots$$

**Figure 3.1:** Kinship markedness hierarchy (Greenberg 1966)

Creating a separate typology for almost every universal that can be drawn from the hierarchies given above was considered by Greenberg himself as “clumsy and rather unrevealing”; also “in other instances the sheer number of possible typologies makes this approach [of implicational typologies] inadvisable” (Greenberg 1966:82-83). In three cases, however, Greenberg (1966) considered it useful to classify kinship systems typologically. For parental terms, he considered two possible types: languages with two separate terms for FATHER and MOTHER, and languages with a single term for both parents. He found that all spoken languages in his sample were of the first type, leading him to conclude that discriminating the gender of parents is a language universal.

For the second typology, which considers the grouping of terms for FATHER, FATHER’S BROTHER, and MOTHER’S BROTHER, Greenberg (1966) posited five possible kin types, which are given in Table 3.2. In his study, however, he found no evidence for the unknown type.

**Table 3.2:** Greenberg's possible kin types for FATHER and UNCLEs.

<table>
<thead>
<tr>
<th>Possible kin types</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generational type</td>
<td>All relatives have the same term</td>
</tr>
<tr>
<td>Lineal type</td>
<td>FATHER is distinguished from the UNCLEs which get one term, as in English</td>
</tr>
<tr>
<td>Bifurcate collateral type</td>
<td>Each relative has a separate term</td>
</tr>
<tr>
<td>Bifurcate merging type</td>
<td>Paternal relatives are grouped, thus MOTHER’S BROTHER gets a separate term from FATHER and FATHER’S BROTHER</td>
</tr>
<tr>
<td>Unknown type</td>
<td>FATHER and MOTHER’S BROTHER are grouped, FATHER’S BROTHER gets a separate term</td>
</tr>
</tbody>
</table>
The third typology of kinship Greenberg (1966) proposed is based on the grouping of grandparents. Of the 15 possible types (Table 3.3) only eight were attested in his data.

**Table 3.3: Greenberg's kinship types for grandparental terms.***

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Greenberg’s finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>FaFa, FaMo, MoFa, MoMo</td>
<td>common</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 2</td>
<td>FaFa, FaMo</td>
<td>MoFa, MoMo</td>
<td></td>
<td></td>
<td>occurs</td>
</tr>
<tr>
<td>Type 3</td>
<td>FaFa, MoFa</td>
<td>FaMo, MoMo</td>
<td></td>
<td></td>
<td>common</td>
</tr>
<tr>
<td>Type 4</td>
<td>FaFa, MoMo</td>
<td>FaMo, MoFa</td>
<td></td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 5</td>
<td>FaFa</td>
<td>FaMo, MoFa, MoMo</td>
<td></td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 6</td>
<td>FaMo, FaFa</td>
<td>FaFa, FaMo, MoMo</td>
<td></td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 7</td>
<td>MoFa, FaFa</td>
<td>FaFa, FaMo, MoMo</td>
<td></td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 8</td>
<td>MoMo</td>
<td>FaFa, FaMo, MoFa</td>
<td></td>
<td></td>
<td>occurs</td>
</tr>
<tr>
<td>Type 9</td>
<td>FaFa, FaMo</td>
<td>MoFa</td>
<td>MoMo</td>
<td></td>
<td>occurs</td>
</tr>
<tr>
<td>Type 10</td>
<td>FaFa, MoFa</td>
<td>FaMo</td>
<td>MoMo</td>
<td></td>
<td>occurs</td>
</tr>
<tr>
<td>Type 11</td>
<td>FaMo, FaMo</td>
<td>FaMo</td>
<td>MaMo</td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 12</td>
<td>FaMo, MoFa</td>
<td>FaFa</td>
<td>MoMo</td>
<td></td>
<td>occurs</td>
</tr>
<tr>
<td>Type 13</td>
<td>FaMo, MoMo, FaFa</td>
<td>MoFa</td>
<td></td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 14</td>
<td>MoMo, FaMo</td>
<td>FaFa</td>
<td>FaMo</td>
<td></td>
<td>not attested</td>
</tr>
<tr>
<td>Type 15</td>
<td>FaFa</td>
<td>FaMo</td>
<td>MoFa</td>
<td>MoMo</td>
<td>common</td>
</tr>
</tbody>
</table>

FaFa: Father’s Father; FaMo: Father’s Mother; MoFa: Mother’s Father; MoMo: Mother’s Mother

* The letters at the top of the columns simply refer to the grouping, and have no meaning.

Greenberg’s (1966) contribution to kinship terminology is thus twofold. On the one hand, he suggested implicational hierarchies with respect to marking of kinship terms, which can only be used when kin terms are compared to one another (i.e. ‘grandfather’ is marked versus unmarked ‘father’). On the other hand, he developed three typologies based on parental terms, male relatives of the ascending generation, and grandparental terms. Not all of the logically possible types within these typologies were attested in his sample.

In sum, it appears that there are kinship types among languages, but only one kinship universal: all languages make a distinction between FATHER and MOTHER, thus discriminating the gender of each parent. With siblings and children, this gender discrimination commonly occurs, but not universally. Furthermore Greenberg’s (1966) implicational hierarchy (see Figure 3.1) indicates which sets of terms should occur together,

One important methodological problem with Greenberg’s (1966) seminal study on kinship terminology is the fact that a clear definition of kinship term is missing. Importantly, it remains unclear whether compounds should be included or not. This point is returned to in the following sections.
3.1.2. Kinship terms in Inuktitut

In terms of Greenberg’s (1966) typologies, the following patterns are observed in Inuktitut. First, Inuktitut distinguishes gender in terms for FATHER and MOTHER. Second, it is of the ‘bifurcate collateral type’ when it comes to FATHER and UNCLE: it has different terms for FATHER (ataata), FATHER’S BROTHER (akkak), and MOTHER’S BROTHER (angak). Third, with respect to GRANDPARENTS, Inuktitut is of Greenberg’s Type 2 (see Table 3.3), as it has one term denoting GRANDFATHER (ataatatsiaq) and a different term denoting GRANDMOTHER (anaanatsiaq).

![Inuktitut kinship terms: male (△) and female (○) Ego (adapted from Maxwell 1994).](image)
From Maxwell’s (1994) description of the kinship terms used by the inhabitants of Repulse Bay, it appears that gender relative to the Ego is an important aspect of the system. Kinship terms differ slightly for male or female Ego. Moreover, the gender of the relative is crucial. Both male and female Egos use *angaju* for OLDER SIBLING OF THE SAME GENDER and *nukaq* for YOUNGER SIBLING OF THE SAME GENDER. Relative age is of limited importance: for siblings of the opposite gender, terms differ but do not encode relative age: male Ego uses *najak*, and female Ego uses *ani*, for SIBLING OF THE OPPOSITE GENDER. These latter terms are also used for the cousins of the opposite gender, i.e. SISTER and FEMALE COUSIN of a male speaker are referred to with the same term *najak*. For ascending and descending relatives, however, male and female Egos use the same terms: *ataata* (FATHER), *anaana* (MOTHER), *irniq* (SON), *panik* (DAUGHTER), and the terms for GRANDPARENTS and GREAT-GRANDPARENTS of both sides of the family. In Figure 3.2, diagrams of the kinship system are given for Egos of both genders. This makes the importance of gender in the system clear.

3.1.3. Kinship research in sign languages

There are relatively few studies of kinship terms in sign languages but they cover many parts of the world as diverse as Argentina (Massone & Johnson 1991), Japan (Peng 1974), Mongolia (Geer 2011), and Adamorobe in Ghana (Nyst 2007). A few cross-linguistic studies also exist, and these are the focus of this section, as they cover a rather large set of sign languages.

Woodward (1978) studied kinship terms in 20 sign languages in order to compare sign language data to Greenberg’s (1966) data. Excluding borrowed signs, he included all native signs that refer to consanguineal kin, both monomorphemic or polymorphemic signs, calling these basic kin terms. This term is not common in kinship research and was possibly created in analogy to basic colour term (see 3.2.1 for discussion). The language sample was restricted since it included separate sign languages as well as varieties of sign languages, for example, old and modern varieties of the American, French and Scottish Sign Languages, and formal and informal varieties of Auslan. He indicates that most of his sources were informants, but whether these informants were native signers of the respective sign language remains unclear. Woodward’s work has been criticised (Nyst 2007; Wilkinson 2009) for its lack of methodological clarity, but it is still valuable.

Woodward’s (1978) study resulted in a number of interesting findings with respect to Greenberg’s (1966) claims (see 3.1.1). For instance, his sample confirmed the markedness relationship between collateral and lineal relatives (Table 3.1) in sign languages. However, on the basis of his sample, he also claimed that no sign language distinguishes between SON and DAUGHTER. Several counter-examples have since been found; for example,

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12 Please remember that Inuktitut has many different dialects (see section 1.2.2). Not all terms are the same across all dialects. This is true for many semantic fields. Still, at least for kinship terms, the relevant categories are the same across dialects. The reader who wants to learn more about different varieties is referred to the NLD website. The data discussed here are from the dialect described in the papers mentioned, so with respect to kinship, this is the dialect of Repulse Bay (see Figure 1.3 for a map).
NGT has separate signs SON and DAUGHTER, both of which are different from the sign CHILD. Woodward’s finding might have to do with his use of the term basic kin term, which is unfortunately not clearly defined in his article. Here again it is not clear whether compounds are included or not.

His most striking finding, however, was a counter-example to the universal that all languages distinguish gender of parents: Indian Sign Language does not distinguish between FATHER and MOTHER. Woodward (1978:132) therefore proposed to restate the universal in an implicational form: “If sex distinctions are made in a kinship system, then sex distinctions must be made for parents.”

Wilkinson (2009) explored the relationship between the linguistic form and function of kinship terms. She investigated data from 40 sign languages based on available dictionaries, whereby she sometimes faced the problem that terms such as UNCLE were not included. She analysed the data in light of two of Greenberg’s (1966) findings. In contrast to Woodward (1978), she confirmed the universal that all languages have separate terms for FATHER and MOTHER. Wilkinson’s data also included IPSL (presumably the same as Woodward’s Indian SL), and since her analysis is much clearer and more extensive, it is more convincing.

Greenberg’s typology for the grouping of FATHER, FATHER’S BROTHER, and MOTHER’S BROTHER was also in general confirmed, although Type 1 (generational; cf. Table 3.2) did not occur in her data. Type 2 (lineal: FATHER vs. UNCLE) was the most prevalent pattern among all sign languages (found in 25 out of 40 sign languages). Nine out of 40 sign languages were classified as Type 3 (bifurcate collateral), having a separate term for each of the three relatives. The bifurcate merging type (Type 4), in which FATHER and FATHER’S BROTHER are expressed by the same term, while MOTHER’S BROTHER has a separate term, was only found in Tanzanian Sign Language. Type 5 was not found among the sign language data, similar to its non-existence in Greenberg’s (1966) data.

Sometimes, the meaning of person terms (such as ‘man’ or woman’) can be extended to refer to relatives. However, it is a point of methodological concern whether person terms should thus also be included in a discussion of kinship terms Wilkinson (2009) did include person terms in her analysis of kinship terms, since she found that in four sign languages – Brazilian, Kenyan, Namibian, and Nepali Sign Languages – both parent terms are extended from the person terms (MAN/WOMAN). This pattern has also been described for AdaSL (Nyst 2007), a language not included in Wilkinson’s (2009) study.

It remains unclear whether, and if yes how, these person terms are disambiguated from the kinship terms. Wilkinson (2009) does not explain clearly in what way the context could contribute to, for instance, the interpretation of the sign MAN as FATHER. Also, it is not clear whether this phenomenon, that is, the extension of person terms to refer to relatives, is taken into account in the analyses of spoken language kinship terms. Therefore, I considered it the most conservative strategy not to include person terms in the analysis of kinship terms (see below for further discussion).

Wilkinson (2009) also compared her data to Woodward’s findings, but I will not go into these comparisons here because of the unclear methodology of Woodward.
3.1.4. Kinship terms in IUR

After having annotated kinship terms in the spontaneous data, I elicited kinship terms with the aid of a drawing of a family tree in order to confirm and possibly supplement the findings. The same signs that occurred in the spontaneous data were also given in this task. Both types of data revealed that there appear to be only a few signs denoting kinship in IUR. Only one sign refers to collateral kin, namely SIBLING as pictured in Figure 3.3. The index finger of the dominant hand taps twice on the index finger of the non-dominant hand.

![Figure 3.3: SIBLING](image)

This sign has a default male interpretation, as do many other signs in IUR. Instances in the data in which the sign was combined with MALE and FEMALE made it clear that the sign should be glossed as ‘sibling’; this was also confirmed by the informants.

IUR has one sign referring to lineal kin, namely ELDER (Figure 3.4). The handshape in this sign is very lax. The fingers are curved, and the thumb is loosely extended. The hand moves from the ipsilateral to the contralateral side of the mouth without contact with the face or mouth at any time during the articulation of the sign. Again, the default meaning of this sign is ‘male parent’, and it thus refers to FATHER, while in combination with FEMALE (see Figure 3.6.a), it means MOTHER. Informants told me that the sign means ‘elder’, but in the spontaneous corpus data, the sign was only used to mean PARENT. This might be due to the nature of the data, as Inuit elders were generally introduced with a name sign.

![Figure 3.4: ELDER (begin and end locations)](image)
IUR thus does not have two separate terms for FATHER and MOTHER, but it also does not have one single dedicated term for both parents.

There is only one sign in the domain of affinal kin, the sign SPOUSE (Figure 3.5). The index and thumb of the dominant hand touch the base of the ring finger of the non-dominant hand twice, the thumb being on the palm side of the finger (not visible in the picture).

![Figure 3.5: SPOUSE](image)

IUR neither has lexical signs nor compounds to refer to non-core family, such as GRANDPARENT, AUNT and UNCLE, and NEPHEW and NIECE. All of these family members are usually referred to by a name sign, which most often is a description of some of the person’s features or characteristics – a strategy for coining name signs that is also common in many other sign languages (see inter alia Desrosiers & Dubuisson (1994) for Quebec SL; Hedberg (1994) for Swedish SL; Schuit (2007) for NGT). In order to express GRANDFATHER and GRANDMOTHER, signers may also use a modified version of the sign ELDER, with slower and more tense movement, as if to express ‘someone really older’. It is also possible to use the sign OLD-PERSON in combination with ELDER.

As mentioned at the end of section 3.1.3, several sign languages use general person terms to refer to kin by means of semantic extension. In IUR the signs FEMALE (Figure 3.6.a) and MALE (Figure 3.6.b) are used to refer to family members also, but as the glosses indicate, these are signs with a more general meaning that may denote the gender of any animate being. In contrast to Nyst (2007) and Wilkinson (2009), I do not consider these signs as proper kinship terms. The main reason is that these signs are not only used to denote a single kinship relation in IUR, but rather several relations. That is, FEMALE may refer to MOTHER, SISTER, or DAUGHTER when used in stories about kin, and MALE may refer to FATHER, BROTHER or SON (as for non-kinship interpretations, the signs may also mean ‘woman’ and ‘man’, respectively). The exact meaning of MALE/FEMALE has to be inferred from the context, and often community knowledge is essential for the interpretation of the term. Furthermore, during the elicitation task, the informants did not attribute MALE and FEMALE to any relative. Rather, the signs were used to specify the gender of the relative, for instance SIBLING MALE ‘brother’ and SIBLING FEMALE ‘sister’.
As adjective, MALE is used much less often than FEMALE, as most signs referring to people and animals are male by default. MALE by itself may refer to FATHER or BROTHER, but the signs ELDER or SIBLING are sufficient to refer to these relatives. MALE by itself is mainly used for contrastive purposes, as in (1).

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\text{hs, ffr}
\]

(1)  FEMALE PERSON MALE, NEG-1 FEMALE, MALE INDEX\_picture

‘A woman and a male child, not female, a boy in this picture.’

It is interesting to note that the image schema underlying FEMALE, that is, the iconic motivation for the sign, is in line with the pattern that has been found to be the most common one cross-linguistically (Wilkinson 2009) (see Figure 3.6.a). The image schema underlying MALE however, is different from those observed by Wilkinson (2009) based on her sample of 40 sign languages, as it refers to a man’s penis (Figure 3.6.b). The same schema has been found in Urubú-Kaapor SL of Brazil (Ferreira Brito 1984) and in YSL of Australia (Anastasia Bauer, p.c.).

IUR has a sign that is used to refer to children, but closer inspection of the data reveals that it is inappropriate to gloss the sign as CHILD, as it may also refer to adults. It therefore appears more appropriate to gloss it as PERSON. The height at which the sign is articulated may provide information about the age of the referent, but in the corpus data, it is not used systematically. Different heights are only used for contrasting two people, that is, to denote an older and a younger person. However, when two instances of this sign are separated by other signs, the two signs may refer to an older and a younger person, even when the height of articulation of each sign PERSON is the same. Conversely, two instances of this sign may vary in height, but may still both mean CHILD, as indicated by the context. Because of this unsystematic use, the sign is glossed as PERSON. In Figure 3.7, three different variants of the sign are given. The sign in Figure 3.7.a is the first occurrence of PERSON in example (2), referring to the signer’s younger sister, while the sign in Figure 3.7.b is the second occurrence of PERSON in this example, referring to the signer’s mother. Thus, in these two instances, height of articulation could be taken as an indication of the referents’ age. However, the same signer also provided examples of PERSON that are articulated at the
same height or even higher than the signer’s head, but still refer to someone younger, as can be seen in Figure 3.7.c, which is a sign referring to DAUGHTER. The attested variation clearly suggests that it is unwarranted to analyse the sign PERSON as including a denotation of the age of a person relative to the signer.

(2)  PRO₁ FEMALE PERSON ELDER PERSON PRO₁ FEMALE THREE SLEEP
‘My female person, elder person, my three females were sleeping.’
(= ‘My sisters and mother were sleeping.’)

![Figure 3.7: Different locations for the sign PERSON.]

3.1.5. Discussion

Sign language kinship systems may be influenced by the wider culture; many terms in NGT, for instance, follow the kinship system of Dutch. Some compounds are even literally translated, as for example KLEIN^KIND (‘grandchild’), which is a compound of KLEIN (‘small’) and KIND (‘child’), just as the corresponding Dutch term kleinkind. However, the terms may also be a reflection of the deaf culture specifically, rather than that of the wider hearing community. Massone and Johnson (1991:356) even argue that the differences between the kinship systems of Spanish and Argentine SL provide evidence for the claim that the Argentine Deaf community is “an ethnic group” in its own right.

With respect to rural sign languages, Nyst (2007) argues for AdaSL that the lexicon has a high degree of macrofunctionality. This term implies a semantic extension of many signs, as for instance the signs for MAN and WOMAN, which, in specific contexts, may extend their meaning to mean FATHER and MOTHER. This macrofunctionality is also observed in IUR, as the signs MALE and FEMALE may extend their meaning, as may other signs. Both Nyst (2007) and Wilkinson (2009) have analysed person terms as kinship terms in their studies. Yet, although the IUR signs FEMALE and MALE are discussed here, I have argued that they should not be included in the IUR kinship system.

Data analysis revealed that IUR only has three dedicated kinship terms, namely ELDER, SIBLING, and SPOUSE. This is in stark contrast to the Inuktutit system, which is quite
elaborate and has, for instance, four terms for siblings alone. It is possible that IUR does not need to lexicalise such more fine-grained kinship distinctions, as it makes abundant use of pointing, for present and absent referents; in the case of the latter, the index points to the general location of someone’s house. Name signs or more general descriptions of people are also commonly used to refer to family members. Community knowledge is likely to play a large role in understanding who is referred to, and more importantly, the kin relations they are in. The sign SIBLING hardly ever occurs by itself; most often it is followed by a specification of the specific sibling, as most people have more than one sibling. An example is given in (3), where the noun phrases are indicated by square brackets. Note that all four noun phrases include a list buoy on the non-dominant hand, glossed as COUNT-X (see 3.4.4.2 for further discussion). In this example, PERSON is also used to refer to siblings. The first NP contains the sign PERSON used to clarify that the preceding sign is a name sign referring to a person and not to a location, since the same sign may be used to refer to a lake as well. The second NP contains the sign SIBLING in combination with the specification DEAF, specifying the deaf sibling of the signer. In the third NP, the sign PERSON is used again, this time with the specification YOUNG to indicate the signer’s younger brother, and in the fourth NP, the signer refers to himself.

(3)  [COUNT-ONE NAME-SIGN PERSON] [COUNT-TWO SIBLING DEAF] [COUNT-THREE PERSON YOUNG] [COUNT-FOUR PRO1 PERSON] WALK
     ‘My name sign brother, my deaf brother, my younger brother and myself walked.’

There appear to be clear differences between the systems of IUR and Inuktitut, since kinship relations, which are an important part of Inuit culture, are hardly lexicalised in IUR. Relatively few studies of kinship in a sign language have compared a given system to the spoken language and/or the surrounding culture. For Argentine SL (LSA), Massone & Johnson (1991) describe the striking feature that only the signs FATHER and MOTHER are distinguished for gender, in contrast to Spanish, where gender is commonly marked. Furthermore, LSA has the sign COLLATERAL-RELATIVE that refers to all collateral as well as to close affinal relatives, a sign which has no equivalent in Spanish. Nyst (2007) found that the kinship set in AdaSL is more restricted than that of Akan – similar to what I found for IUR. Akan does have some influence on AdaSL kin terms due to borrowing of mouthings. Much more data is needed to investigate in how far other sign languages follow the cultural patterns of the spoken language community and in what respects they pattern differently.

The set of kinship terms in IUR is very small compared to other sign languages. In Wilkinson’s (2009) study, the smallest set of kin terms, that of Croatian SL, is six while the highest reported number is 58 for Nepali SL. It should be noted, however, that her samples also included lexical variants and compounds, and person terms that semantically extend to kinship terms. For IUR, compounds cannot be included as there are no fixed compounds for kinship terms in IUR. The Croatian SL set might in fact be as small as the IUR set, since it includes person terms.
Greenberg’s (1966) claim that all languages discriminate the gender of parents seems problematic in the light of the IUR data. IUR has one sign ELDER, which may combine with the signs MALE and FEMALE to distinguish between FATHER and MOTHER. Based on discussion with the informants, addition of the sign FEMALE is obligatory whenever MOTHER is referred to, as ELDER has a default meaning of FATHER. If compounds were to be included in the set of kinship terms, then IUR would lose its exceptional status with respect to parental terms.

3.2. Colour terms
3.2.1. Universals and general properties of colour terms

Colour terms have been studied more extensively than kinship terms, and clearer universal patterns have been identified. In their seminal study on colour terms, Berlin and Kay (1969) wanted to show that the strict linguistic relativity hypothesis, which describes languages as semantically arbitrary relative to each other, fails with respect to colour terms. Most importantly, they showed that the categorisation of colour is not random, and that the focal points of the different colours are similar across languages. Crucial for their classification is the notion of basic colour term, which they define based on the following criteria:

Criterion 1: the term must be monolexemic, i.e. derived terms like ‘dark-green’ and ‘greenish’ are not basic.
Criterion 2: the meaning of the term should not be incorporated in another colour term, i.e. ‘crimson’ is not basic as it can be subsumed under RED.
Criterion 3: the term should be applicable to general items, which excludes terms such as ‘blond’.
Criterion 4: the colour term must be psychologically salient. This means that the term should have “a tendency to occur at the beginning of elicited lists” (Berlin and Kay 1969:6) and that across all informants and all situations, the term must be the same.

Criteria 1-4 turned out to be adequate in nearly all cases, but for the more difficult cases criteria 5-8 were established.

Criterion 5: the term should follow the same derivational and combinational patterns as the basic colour term. For instance, it is possible to create ‘reddish’ from ‘red’. If ‘gold’ were the doubtful term, this rule ‘colour term + ish’ could indicate whether ‘gold’ is a basic term, which it is not because *‘goldish’ is not a word.
Criterion 6: the term cannot also name an object, as, for instance, ‘gold’ and ‘silver’.
Criterion 7: borrowed colour terms should be regarded with caution.
Criterion 8: morphologically complex words should also be regarded with caution.

Criteria 1-4 will be referred to as the primary, and 5-8 as the secondary criteria.

Berlin and Kay (1969) defined seven stages of basic colour term lexicalisation. Various revisions of their original proposal have been suggested, but here the reference point is the work of Kay (1975) himself. At Stage I, a language has two colour terms, and these are always BLACK and WHITE (or dark versus light). At Stage II, a third term appears, namely RED. At Stage III, the language also has either YELLOW or GRUE, a term that covers both BLUE and GREEN in English. At Stage IV, the language has terms for both these colours. At Stage V, the language has separate terms for BLUE and GREEN, thus having six colours. At Stage VI, BROWN is introduced in the lexicon of the language. At the last stage (VII), the colour lexicon expands extensively with the remaining three colours PURPLE, PINK, and ORANGE. GREY is special as it may appear at any stage according to Berlin and Kay (1969), a claim that has been supported by later studies (see Kay 1975 for references). The development of basic colour term lexicalisation is illustrated in Figure 3.8.

![Figure 3.8: Basic colour term hierarchy (based on Kay 1975:260).](image)

### 3.2.2. Colour terms in Inuktitut

There is variation in colour term systems among the different dialects of Inuktitut, and authors who have studied colour investigated different dialects and used different spelling. An overview is given here. First, it is worth noting that all Inuktitut colour terms are verb forms (McGrath, native speaker, p.c.), which is why they carry a third person singular suffix (-tuq or -tak in most cases). Furthermore, Inuktitut does not have a word meaning ‘colour’ (NLD website). Berlin and Kay (1969) themselves included Canadian Eskimo in their classification, based on information by Graburn (p.c.), and classified the language as a Stage IV language, since Graburn had indicated that there are five basic colour terms: gakurktak\(^\text{14}\) (WHITE), girmitak (BLACK), anpaluktak (RED), tungajuktuk (GREEN), and guksutak (YELLOW). Graburn was unsure whether swangnak (GREY) and kajuk (BROWN) are basic colour terms.

\(^{14}\) It should be noted that the spelling of Berlin and Kay (1969) is inconsistent with the current spelling of Inuktitut, as Inuktitut has few words beginning with g.
Heinrich (1974) interviewed nine Inuit elders who spoke five different Central Canadian Inuktitut dialects. The colour terms he found, as well as the base nouns from which these colour terms are derived, are given in Table 3.4. Some dialects have one term GRUE, while others distinguish BLUE and GREEN. The term for GRUE is derived from the same base noun as the term for BLUE in other dialects. He thus concludes that Inuktitut only has two basic colour terms. It is thus in Stage 1 following Berlin and Kay (1969).

Table 3.4: Inuktitut colour terms (after Heinrich 1974)15.

<table>
<thead>
<tr>
<th>Colour term Central Canadian Inuktitut</th>
<th>Translation</th>
<th>Base noun</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>qignutuq</td>
<td>BLACK</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>qaquxtuq/quaulluxtuq</td>
<td>WHITE</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>aupalluxtuktuq/aupayaaxtuq</td>
<td>RED</td>
<td>auk</td>
<td>‘blood’</td>
</tr>
<tr>
<td>qaqsuxtuq</td>
<td>YELLOW</td>
<td>quq</td>
<td>‘urine’</td>
</tr>
<tr>
<td>tunguxtuq/tunguyuxtuq</td>
<td>BLUE, GRUE</td>
<td>tunguq</td>
<td>‘liver’</td>
</tr>
<tr>
<td>sungaxtuq/sunguyaxtuq</td>
<td>GREEN</td>
<td>sungaq</td>
<td>‘bile’</td>
</tr>
<tr>
<td>qayuxtuq</td>
<td>BROWN</td>
<td>qayuq</td>
<td>‘blood soup’</td>
</tr>
</tbody>
</table>

Similarly, Fortescue (1984) describes the base nouns for the colours in Kalaallisut (West-Greenlandic), with only a small difference in the base nouns for GREEN and YELLOW, as Fortescue inverts the translations given in Table 3.4.

Omura (1998) describes colour terms in the Arviligjuaq dialect spoken in the community of Kugaaruk. Based on his informants, Omura concludes that there are six terms that only refer to colour, and have a monomorphemic stem. These are the same as those provided by Graburn, but Omura (1998) includes BROWN (kajuqtuq in the Arviligjuaq dialect) as a basic colour term. It is remarkable, however, that Omura (1998) concludes that the colour terms are all monomorphemic, while according to Heinrich (1974), similar colour terms – apart from the terms for BLACK and WHITE – are actually multimorphemic, as they are derived from nouns.

Given the problems with Omura’s suggestion, I decided to adopt Heinrich’s (1974) line of argumentation. Applying Berlin and Kay’s (1969) criteria for basic colour terms, the Inuktitut dialects thus have only two basic colour terms, namely BLACK and WHITE. Inuktitut is thus a Stage I language.

15 Please note that Heinrich’s spelling is inconsistent with the current spelling of Inuktitut, as no dialect uses x in its spelling.
3.2.3. Colour terms in sign languages

Woodward (1989) describes how ten unrelated sign languages also follow the colour hierarchy of Berlin and Kay (1969). All ten sign languages have terms for BLACK and WHITE, and if there is a third term, this is indeed a sign for RED. Throughout his sample, the following term is YELLOW, followed by BLUE and GREEN. Woodward (1989) therefore concludes that sign languages also follow the colour hierarchy originally proposed for spoken languages.

Nyst (2007), however, criticises Woodward’s methodology, as he does not take the criteria for basic colour terms into account. The definition of basic colour terms as put forward by Berlin and Kay (1969) actually excludes many colour signs because they are either derived or non-native. According to Nyst (2007), derived colour signs are either pointing signs, or signs for an object that typically has the intended colour. In some dialects of NGT, for instance, the sign ORANGE may refer to the fruit and the colour (note that the corresponding Dutch words are different: oranje (the colour) and sinaasappel (the fruit)). Pointing to an object in the direct environment, or pointing to a body feature occurs in several sign languages. Both Nonaka (2004) for Ban Khor SL and De Vos (2011) for Kata Kolok describe how the expression of non-lexicalised colours is preceded by an apparent search, after which the signer points to the object with the intended colour. This strategy has only been described for village sign languages and De Vos (2011) suggests possible explanations for this lack of lexicalisation: (i) the context-dependence of village sign languages makes pointing always possible; (ii) shared village knowledge allows signers to interpret idiosyncratic expressions, and (iii) the absence of education, as education requires the decontextualisation of terms, and thus the need for colour signs appears.

Pointing to body features has also often led to lexicalised colour signs. Ban Khor SL and Kata Kolok both have signs for WHITE, BLACK and RED, in which pointing to the teeth, the hair and the lips, respectively, occurs. This phenomenon is also attested in urban sign languages, where pointing sometimes undergoes phonological changes. In NGT, for instance, the sign RED is articulated by stroking the lips with the index finger.

Colour signs are considered non-native when they are borrowed from the spoken language, either through the use of mouthings or through the use of fingerspelling (Nyst 2007). An example of the latter is the sign BLUE in NGT, which is an abbreviated fingerspelling of B, L and U, derived from Dutch blauw. The B handshape changes to the L handshape while the movement of the U handshape is retained. Furthermore, Nyst 2007 reports the use of (partial) mouthings from the spoken language in the use of colour signs in AdaSL. This has been described for Konchri Sain, a rural sign language of Jamaica as well (Adone et al. 2012).

Nyst (2007) argues that only arbitrary colour signs should be considered basic colour terms. Interestingly, these are not only uncommon in sign languages, but are also most likely to refer to colours low on the hierarchy. For instance, GREEN and PURPLE are arbitrary colour signs in NGT, and GRUE is the only arbitrary colour sign in Kata Kolok (De Vos 2011). Consequently, Nyst (2007:92) suggests that “the definition of basic colour
term needs reconsideration in the context of sign languages”, as many basic colour signs are either derived or non-native.

Hollman and Sutrop (2011), however, argue that Nyst (2007) has taken the definition of basic colour terms too literally, as derived and non-native colour signs are only excluded by the secondary criteria, which should only be applied if a colour term poses difficulties. They suggest that these colour signs should be examined carefully and not be automatically excluded from the set of basic terms. They do agree that the strategy to form colour signs by pointing to an object is problematic. De Vos (2011), on the other hand, argues that pointing is a unique linguistic strategy in sign languages. Since the body provides a static location, signers can point to body parts again and again, possibly creating a lexicalised colour sign. This discussion is likely to be continued, but here I follow Hollman and Sutrop (2011) and De Vos (2011) in assuming that each colour sign should be analysed as a new case, instead of concluding that all colour signs in a specific sign language are non-basic. Moreover, pointing should be reconsidered with respect to basicness, and in my opinion some pointing signs can be considered basic colour terms (cf. 3.2.5). As Nyst (2007) suggested, the definition of basic colour term needs to be reconsidered for sign languages. Nevertheless Woodward’s (1989) finding that the lexicalisation of colour signs, including derived and non-native signs, follows the same pattern as described for spoken languages remains interesting.

### 3.2.4. Colour terms in IUR

According to my informants, IUR does not have a sign meaning ‘colour’ and thus patterns with Inuktitut in this respect. Further, the language has only two colour signs, neither of which would be a basic colour term according to Berlin and Kay’s (1969) secondary criteria, as they are derived from noun signs, similar to what has been described for other sign languages (cf. 3.2.3 regarding NGT ORANGE). However, in striking contrast to what has been found cross-linguistically, these two signs are the signs for the colours BLACK and RED. On the one hand, the sign BLACK can also mean ‘hair’ (Figure 3.9). This has been described for other sign languages as well, for instance, for Kata Kolok (De Vos 2011) and Ban Khor SL (Nonaka 2004). On the other hand, the sign RED is similar to the sign BLOOD (Figure 3.10). This is an interesting parallel to Inuktitut, as aupalaktuq (‘red’; aupalluktuq in Table 3.4) is also derived from auk (‘blood’). It should be noted, however, that cross-linguistically, the noun ‘blood’ is a fairly common source for the term for ‘red’, as attested, for instance, in Mian (Papuan; Fedden 2011) and Warlpiri (Australian; Reece 1970), to give just two examples.
Other colours are not lexicalised, thus in order to express GREEN and BLUE, for example, but also for WHITE, the signer would point to an object of the intended colour. Similar to what De Vos (2011) describes for Kata Kolok signers, the pointing sign is preceded by a search for an object of the intended colour.

In an elicitation setting, that is, when asked to provide a sign for a specific colour using colour cards, the IUR signers described an object that is typically of the intended colour. For example, to denote WHITE, one signer described a seal hunter’s clothing which is always white in order not to be visible for the animals in the snowy surroundings. Most of these descriptions are difficult to interpret without knowledge of Inuit culture and life, as they involve objects typically present in Nunavut. No such descriptions have been found in the spontaneous data, however, not even when there was no suitable object in the environment to point at for a specific colour. In those cases, an object of a colour that resembled the intended colour was used as a referent, for instance, pointing at a beige coloured wall to indicate WHITE.

The colour signs may be combined sequentially with other signs, as in BLACK DARK (‘really black’) and BLACK DARK LITTLE (‘grey’). Similar modifications are attested in Inuktitut as well, but it is important to note that such modifications were rare in the spontaneous data.
3.2.5. Discussion

As was described in section 3.2.3, there is on-going debate about the basicness of colour terms in sign languages. It should be noted, however, that the theory of basic colour terms has been criticised in general (see Levinson (2001) for an overview of some critiques), but this debate will not be continued here. The four primary criteria proposed by Berlin and Kay (1969) do not exclude derived or borrowed colour signs from the set of basic terms, but colour signs that are formed by pointing to an object raise some issues. In my opinion, a pointing sign should only be considered a basic colour term if the same object is pointed to consistently. All colour signs have to be evaluated separately, based on the primary criteria first, and only in case of doubt, a term should possibly be excluded based on the secondary criteria described by Berlin and Kay (1969).

For IUR, I therefore conclude that both BLACK and RED are basic colour signs, even though they are both derived from other signs. Both signs fit the primary criteria. No sign exists for WHITE, a gap that has not previously been described for any other language. IUR is unique in this respect. IUR may either be in a preliminary stage of Berlin and Kay’s (1969) hierarchy of basic colour term lexicalisation, or it must be concluded that the stages they proposed are not applicable to every language.

IUR does not follow Inuktitut colour terms (see section 3.2.2), except for the fact that in both languages RED is derived from ‘blood’. Other derivations found in Inuktitut are not followed in IUR though, for instance the signers do not use the sign for ‘urine’ to refer to YELLOW.

There are several possible explanations for IUR having so few colour signs. The first is that there was never much need to express colours, not only because of the absence of education, which, as mentioned in section 3.2.3, may be argued for rural sign languages in general (De Vos 2011), but also because of the lack of a colourful world for most of the year. Secondly, there is always the possibility to point at something of the intended colour. IUR is highly context-dependent, parallel to what De Vos (2011) described for Kata Kolok and other rural sign languages. There may be little need for a lexical sign WHITE, for instance, as there is always something white available in the environment, be it the snow outside or the walls of a room. Shared knowledge is also a possible factor. Idiosyncratic expressions may be used to refer to colours, and community knowledge allows people to interpret the expression. When asked to provide signs for the colours in an elicitation setting, signers indeed described objects of local importance (for example, the hunter’s clothing for WHITE). In the spontaneous IUR data, however, these descriptions were never used. Colours are not mentioned often, and if there is a need to refer to a colour other than BLACK and RED, the signer would use pointing.

3.3. Time reference
3.3.1. General properties of time reference

No typological classifications comparable to those suggested for kinship and colour terms exist for time expressions, nor have any universals been posited. It might be possible,
however, to classify languages based on the metaphors related to time they use. I briefly introduce these metaphors, as they become relevant in the discussion of “time lines” in sections 3.3.3 and 3.3.4.2.

The metaphors ‘the future is ahead’ and ‘the past is behind’ can be found in many languages all around the world (Traugott 1978). These conceptual metaphors are reflected in terms and idioms that are used to talk about time, as many languages use terms originally associated with the spatial domain to talk about time (Haspelmath 1997; Moore 2006; Núñez, Cooperrider, Doan & Wassmann 2012). Still, the way how spatial terms are mapped onto the temporal domain differs among languages. In Mandarin, for instance, “speakers systematically use vertical metaphors to talk about time” (Boroditsky, 2001:5), while in English horizontal metaphors are used most systematically. Thus, where in English uses as ‘front’ and ‘back’ are found in time reference, Mandarin uses terms meaning shàng ‘up’ and xià ‘down’. In (4), the spatial use of shàng is illustrated, while in (4), its temporal use is illustrated. Interestingly, shàng refers to the past, while xià refers to future, as can be seen in (4).

(4)  
   a. Mǎo shàng shù  
       ‘cats climb trees’  
   b. Shàng ge yuè  
       ‘last (or previous) month’  
   c. Xià ge yuè  
       ‘next (or following) month’ (Boroditsky 2001:6)

Furthermore, studies have shown that the present is always associated with the speaker’s immediate surrounding or location. In no language of the world studied so far it has been found that the present would be connected to a location away from the speaker (Núñez et al. 2012).

As for the conceptualisation of past and future tense, it seems that only few languages use spatial metaphorical expressions different from the ones described above. In Aymara (Amerindian, spoken in the Andean highlands), for instance, expressions for PAST often include the word nayra ‘eye/sight/front’, while expressions for FUTURE include the word qhipa ‘back/behind’ (Núñez & Sweetser 2006) – thus the opposite of what was described above. Similar patterns are attested in Malagasy, the language of Madagascar (Dahl 1995) and in Tuvan, a language spoken in Russia (Vitaly Voinov, p.c.). Furthermore, Núñez et al. (2012) look at the gestures used by the Yupno people (Papuan: Papua New Guinea) when talking about time, and conclude that the Yupno perceive time topographically. Regardless of which way a speaker is facing, his gestures accompanying time terms will follow the geometry of the local terrain. The past is conceptualised as downhill, and the future as uphill (Núñez et al. 2012). Surely, speakers of other languages also gesture according to the spatial metaphors used for time reference in their languages, but the Yupno case is interesting as the temporal expressions do not reflect the conceptualisation, with only one exception, which is glossed in (5).
It seems, however, that most languages for which studies regarding the use of metaphor in temporal expressions are available, perceive the future to be ahead of and the past to be behind a person. It is outside the scope of this thesis to expand on reasons for this almost universal metaphor regarding time.

3.3.2. Time reference in Inuktitut

Before turning to a spatial metaphor regarding time that appears to be relevant in Inuktitut, it first has to be explained that the Inuit have a different perception of time:

“Inuit perceive and express time as an extent of space through which one is moving rather than as a succession of events whose dates of occurrence can be measured with numbers.” (Dorais 2010:146)

In Inuktitut, time is conceptualised as being circular, while in English it is linear (McGrath 2008). In English, for instance, the new day replaces the previous, while in Inuktitut, “the night catches up to the day, and then the day catches up to the night” etc. (McGrath 2008:5). Furthermore, McGrath (2008) argues that time in Inuktitut is conceived metaphorically as a ‘place of opportunity’. This implies that time cannot be manipulated, as is possible in European perception (as e.g. in ‘to save/spend time’). For Inuit, “to have time, is to have place of opportunity” (McGrath 2008:3). Inuktitut has in fact no word for ‘time’.

As has been illustrated by the Mandarin examples in (4), spatial relations can be used to express time. In Inuktitut, too, several words have both a spatial and a temporal interpretation, as can be seen in examples (6)-(8).

(6)  manna ‘this one here’, or ‘now’ (Dorais 2010)
(7)  a. sivuniq ‘the fore-part’, or ‘the future’ (McGrath, p.c.)
     b. sivuniminiittuq ‘it is physically in front of me’ or ‘it is in my future’
(8)  a. kinguniq ‘the back part’, or ‘the past’ (McGrath, p.c.)
     b. kingunimniittuq ‘it is physically behind me’ or ‘it is in my past’

From these examples, it seems that in Inuktitut, just as in many other languages, the future lies ahead and the past behind the speaker. However, it is also possible to use (9) to refer to past events.
(9)  *aniguqtuq* ‘it went out and beyond’ or ‘something that is past in time’  
(McGrath, p.c.)

This metaphor suggests a more flexible perception of where the past would be located, either right behind a person (8) or simply away from the speaker, in any direction (9). Still it can be concluded that Inuktitut fits the general pattern of using spatial metaphors for the expression of time.

Beyond the use of metaphor, I will also discuss non-metaphorical lexical items referring to time in IUR, such as general time terms like ‘day’ and ‘week’ as well as the days of the week and months of the year. Note that these latter concepts were not introduced in Inuit culture until Christian missionaries arrived, and this is reflected by the Inuits’ perception of the week: the days of the week are arranged around Sunday, when it is forbidden to work, as is evident from the literal translations of the examples in (10), from the Itivimiut dialect spoken in Arctic Quebec (Dorais 2010).

As can be seen in (10.g), FRIDAY deviates from the other weekdays in the Itivimiut dialect. The term *niritsitut* is based on the weekly food allowance, which Inuit workers traditionally received from the trading companies on Friday (Dorais 2010:158). Some dialects, however, continue the counting strategy for Friday. For instance, for another dialect of Arctic Quebec, Nowak (1994) describes that the term for ‘Friday’, *tallimanganni*, includes *tallimat* ‘five’. No Inuktitut words for the months of the year have been found, apart from borrowings from English (e.g. *tisimpuri* ‘december’ and *maarsi* ‘march’, NLD).

\[
\begin{align*}
\text{(10) a. } & \text{allitut} & \text{‘they abide the taboo’} & \rightarrow \text{‘Sunday’} \\
\text{b. } & \text{allingisunagaqtut} & \text{‘they do not quite abide by the taboo yet’} & \rightarrow \text{‘Saturday’} \\
\text{c. } & \text{alliriiqtut} & \text{‘they cease to abide by a taboo’} & \rightarrow \text{‘Monday’} \\
\text{d. } & \text{aippitut} & \text{‘they add a second’} & \rightarrow \text{‘Tuesday’} \\
\text{e. } & \text{pingatsitut} & \text{‘they add a third’} & \rightarrow \text{‘Wednesday’} \\
\text{f. } & \text{sitammitut} & \text{‘they add a fourth’} & \rightarrow \text{‘Thursday’} \\
\text{g. } & \text{niritsitut} & \text{‘they make them eat’} & \rightarrow \text{‘Friday’}
\end{align*}
\]

3.3.3. Time-lines in sign languages

In sign languages, verbs do generally not inflect for tense (but see Zucchi (2009) for non-manual tense marking in LIS); rather time is expressed by means of lexical items, such as the BSL signs *DAY*, *TOMORROW*, *YESTERDAY*, *NEXT-WEEK* and *LAST-YEAR* (Sutton-Spence & Woll 1999).

Interestingly, most sign languages also make use of metaphorical mappings from spatial to temporal domain, as described above, and all sign languages studied to date employ the mapping which takes the future to be lying in front of the signer’s body, while the past lies behind. In fact, sign languages express the metaphor more literally in signing space by moving signs referring to the future from the body forward into the signing space while
signs referring to the past move backward. In many sign languages, time adverbs like the ones mentioned above are thus placed on, or moved along, a so-called ‘time-line’. Furthermore, remotesness in time can be expressed iconically by modifying the length of the movement of a time adverb, or by using a non-manual adverbial (Schermer & Koolhof 1990; Aarons et al. 1995).

Besides this time-line, for many urban sign languages, two other time-lines, which do not employ the front-back spatial metaphor, have been identified. All three lines are shown in Figure 3.11. Line A is the one already described, a horizontal line that runs over the signer’s ipsilateral shoulder. Line B is also horizontal, but runs from left to right in front of the signer’s abdomen, where (movement to the) left represents the past and (movement to the) right future. Both lines A and B play a role in the articulation of most time adverbials, but which line is used for which time adverbials differs between sign languages. Line C is a vertical line on the signer’s ipsilateral side, and is mainly used to indicate growing up (see Nyst (2007) for use of line C in AdaSL). Use of all three lines has been described, among others, for BSL (Brennan 1983), NGT (Schermer & Koolhof 1990), LSQ (Lacette 1993), and LSE (Cabeza Pereiro & Fernández Soneira 2004).

![Figure 3.11: Common time-lines in sign languages (after Brennan 1983:13)](image)

For most sign languages, a fourth line has been described, but the location of this line varies among sign languages. In NGT and LSQ, for instance, it is a vertical line in front of the signer’s upper chest (Schermer & Koolhof 1990 for NGT; Lacerte 1993 for LSQ) while in BSL, it is a horizontal line on the non-dominant lower arm (Brennan 1983).

Furthermore, celestial time-lines have been described for AdaSL (Nyst 2007) and Kata Kolok (Marsaja 2008). A celestial time-line refers either to the position or the arced path of the sun and the moon. In Kata Kolok, for instance, pointing signs which indicate the approximate location of the sun in the sky during daytime are used for time reference. For example, pointing to approximately 90° up is interpreted as 12:00PM (noon) (Marsaja 2008:166f). This is possible as the village lies close to the equator and therefore the position of the sun does not change year-round. In AdaSL, the celestial time-line is “an arced line
up in front of the signer” (Nyst 2007:110), and lexical time terms make use of this time-line. DAY for instance, is formed by a \( \downarrow \) hand that traces the time-line, while EVENING is formed by a \( \uparrow \) hand that points at the horizon. It can be argued that celestial time-lines are less metaphorical than the other time-lines described above, as they make reference to actual celestial positions.

### 3.3.4. Time reference in IUR

In this section, I first discuss various lexical time expressions in IUR (section 3.3.4.1). Remember that with respect to time expressions, no typological patterns have been proposed in section 3.3.1. The focus is thus on the (non-)existence of such expressions and on possible influences from Inuktitut. In section 3.3.4.2, the existence of time-lines is addressed, including an inventory of the few time adverbials that make use of a time-line.

#### 3.3.4.1. Lexical time expressions

Let me start with a discussion of the IUR sign DAY. This sign is articulated with a \( \uparrow \) hand on the side of the face. The sign can be located on either side of the head, the orientation of the hand depending on the location: if a right-handed signer signs DAY on the right (ipsilateral) side of his head, the palm points toward the head (Figure 3.12). If the same signer signs DAY on the left (contralateral) side of the head, the palm is oriented away from the head. When the hand is on the side of the head, the signer briefly closes his eyes and tilts his head slightly towards the hand. Once the hand moves away from the head, the eyes open and the head moves back to neutral position. Given the phonological similarity to the sign SLEEP, a possible interpretation of this sign is ‘one sleep’. Native informants have reported that this is parallel to the Inuktitut word for ‘day’, which they unfortunately did not provide, and for which the NLD does not give extra information.

![Figure 3.12: DAY, begin and end location.](image)

In most occurrences in the data, DAY is translated as ‘the next day’. In fact, in the data, only one occurrence is found in which DAY is used to refer to a period of time, and this example is given in (11). Interestingly, it is possible to drop the manual part of the sign
DAY. This is often found in reports of actions that took several days, like, for instance, the four-day walk to Baker Lake reported in (11). The four INDEX signs in this example could be followed by DAY, but instead the INDEX is held in its final location, and is accompanied by the non-manual part of DAY (‘ec’ = ‘eyes closed, then opened with emphasis’; ‘ht’ = ‘head tilt’). As is evident from example (11.b), the non-manual marker ‘ec’ also accompanies the sign WAKE-UP.

(11) a. PRO₁ TWO DAY TWO HAMMER
   ‘I hammered for two days.

b. COUNT-FOUR WALK INDEX-LOCₐ --hold WALK INDEX-LOCₐ --hold
   WALK INDEX-LOCₐ --hold BAKER-LAKE GO, WAKE-UP WALK INDEX-LOCₐ FINISH
   ‘The four of us walked to location A. The next day we walked to location B. The next day we went to Baker Lake. After waking up we walked there and arrived.’

Note that no comparable sentences that would include both the manual and non-manual part of DAY were found in the annotated data. This suggests that it is obligatory to drop the manual part of DAY in such sequences.

The lexical signs WEEK and MONTH, pictured in Figure 3.13 and Figure 3.14, respectively, can be used as present and future tense adverbials. From the context, it becomes clear whether they refer to a period of time (e.g. ‘for one week/month’), or whether they mean ‘in a week/month’. Both signs are related to a calendar: WEEK traces the horizontal representation of a week often found on calendars, while MONTH represents the flipping over of a calendar page.

Figure 3.13: WEEK, begin and end location.
Interestingly, these signs are not used as past tense adverbials in the data (‘last week/month’). It seems that the general sign PAST is used to indicate weeks or months in the past.

Surprisingly, no lexical sign for YEAR appears to exist. It appears to be possible to refer to a year with a sequence of signs: WARM^COLD^WARM^COLD, but this was only found in the data once in a context in which the signer referred to a period of time. When checking this unexpected lexical gap with informants, they replied that when growing up, they never learned about YEAR. It therefore seemed worthwhile to check how Inuktitut lexicalises this concept. It turned out that several Inuktitut dialects extend the term uktuq ‘winter’ to mean YEAR (NLD), while some dialects have borrowed a term. The Nunatsiavut dialect, for instance, has borrowed jaari from German Jahre (Dorais 2010:157). Both strategies imply that the concept YEAR was introduced to the Inuit only after contact, and that they previously counted winters. In IUR, however, the sign COLD, may be used in reference to ‘winter’, but not to ‘year’. It appears that concept YEAR is not lexicalised in IUR.

IUR has only one monomorphemic sign for a day of the week, namely SUNDAY, pictured in Figure 3.15. The sign DAY with an incorporated number handshape can be used to refer to the days of the week; ONE-DAY being MONDAY, TWO-DAY being TUESDAY, etc. (cf. 3.4.4.3 below for further discussion of numeral incorporation). Another strategy to refer to the days of the week is to use a list buoy (Liddell 2003) on the non-dominant hand (cf. 3.4.4.2 below); that is, by pointing with the dominant index finger to the little finger (glossed as COUNT-ONE) for MONDAY, or pointing to the thumb (COUNT-FIVE) for FRIDAY. Unfortunately, SATURDAY was not discussed by the informants. Clearly, both strategies are reminiscent of the terms for the days of the week in Inuktitut (at least those from Tuesday to Thursday in (10) above), as they also number the days of a week – be it by means of a number handshape or a list buoy. These strategies are not often used to refer to the days of the week, however. At least in the corpus data, people usually referred to a number of days in the past or in the future, without being specific about the actual day of the week.
It remains unclear whether IUR has signs for months of the year. During the first interview, the bilingual informant PU provided descriptive signs for the months. All signs referred to a specific occasion or celebration in the respective month; for instance, MARCH was signed by drawing a shamrock leaf in the air, a reference to St.-Patrick’s Day on March 17th, and JULY was signed WAVE-FLAG, a reference to Canada Day on the first of July. All other descriptions also referred to Euro-Canadian events that occur in the respective month as well. In Inuktitut, borrowings for the months of the years are found as well, suggesting that the Inuit did not have the concept of MONTH until after contact with Europeans. Therefore, it is not surprising that IUR has borrowed Euro-Canadian concepts to represent the months as well.

To indicate a time of day, signers generally point at their watch and then add a number sign (see section 3.4.4 below) to indicate what hour they mean. This pointing to the watch has been glossed as TIME. To specify the meaning ‘half past the hour’, the sign HALF is used: e.g. TIME EIGHT HALF meaning ‘half past eight’. An exception to this system is the sign TWELVE-O’CLOCK, which has two variants, which are pictured in Figure 3.16. The form of both variants is motivated by the two hands of the clock pointing upwards.
3.3.4.2. Time-lines

Six temporal adverbials which appear to make use of a time-line were identified in the data: TODAY, LONG-AGO-1, LONG-AGO-2, NEXT-DAY, DAY-AGO, and PAST. The sign TODAY is formed by pointing down in front of the signer. The same sign is used to mean ‘here’ and ‘now’, in line with Inuktitut manna, and following the universal pattern that the present is metaphorically associated with the immediate surroundings.

Time-line A appears to be relevant for TODAY and for both variants of LONG-AGO. However, on closer inspection, it turns out that LONG-AGO-1 and LONG-AGO-2 have contrastive movement paths on time-line A: LONG-AGO-1 has a forward movement away from the signer, while LONG-AGO-2 is articulated with a backward movement over the signer’s ipsilateral shoulder. Given that the signs are used interchangeably, the existence of time-line A is thus debatable. These signs however, show parallels with the Inuktitut aniguqtuq, given in (9) above, in the sense that the past is conceptualised as being away from the speaker, in any direction.

Time-line B is used for the signs NEXT-DAY, DAY-AGO, and PAST. As might be expected, NEXT-DAY and DAY-AGO show contrastive movement paths: NEXT-DAY moves from left to right on time-line B, and DAY-AGO moves from right to left. In Figure 3.17, NEXT-DAY is pictured. DAY-AGO is signed with the same handshape at the same location, but moves in the opposite direction.

![Figure 3.17: The sign NEXT-DAY.](image)

The same non-manual marker as described for DAY (see example (11) above) may be used with NEXT-DAY, but it is not obligatory. Examples of the use of NEXT-DAY can be found in (12) below; no non-manual marker was used in these utterances.

(12) a. \( \text{PRO}_1 \) NEXT-DAY NEXT-DAY FEMALE PERSON w\_peg PLANE-FLIES-WITH-STOPS\_here HERE  
   ‘In two days, my female (i.e. daughter) will come (from Winnipeg) here by plane on a non-direct flight.’

b. TODAY WHITE-OUT, NEXT-DAY WHITE-OUT NEXT-DAY WHITE-OUT. PALMS-UP  
   ‘Today, there is a white out, and the next two days as well. Nothing I can do about it.’
In (12), the start location of the second instance of NEXT-DAY is the end location of the first NEXT-DAY. The second instance thus moves even further to the right. In the second example, the sequencing of locations is less clear, because the sign WHITE-OUT intervenes between the two instances of NEXT-DAY.

Similarly, DAY-AGO may be repeated to indicate an exact number of days in the past. It has been observed to be repeated up to four times, as illustrated in (13), where each sign starts at the end location of the previous one.

(13) DAY-AGO DAY-AGO DAY-AGO DAY-AGO PRO1 SKIDOO GO
‘Four days ago, I went out on skidoo.’

Finally, the sign PAST can be used to express various time points located in the past. The sign is similar in movement to DAY-AGO, but is signed with a right-hand. From the context, it should become clear whether the sign has to be interpreted as ‘last week’, ‘last month’, or ‘yesterday’ (for which DAY-AGO might be used as well). PAST can be reduplicated and in those cases, it usually means ‘a couple of weeks ago’ or ‘a couple of months ago’. For ‘a couple of days ago’, usually the sign DAY-AGO is used with a specific number of reduplications, as was shown in (13) for ‘four days ago’. It seems that ‘a couple of days ago’, that is, a reference to the past without indicating a specific number of days, is not used. In order to express the general meaning ‘in the past’, either variant of LONG-AGO may be used. PAST cannot be used for this general meaning.

Interestingly, no sign meaning ‘future’ has been found. The opposite of LONG-AGO seems not to be lexicalised in IUR. Furthermore, use of a celestial time-line has not been observed. One explanation might be the drastically varying position of the sun throughout the year in the Arctic – or, in other words, the absence of the sun in the winter and its over-presence in the summer.

3.3.5. Discussion

Three time terms have been described for IUR – DAY, WEEK and MONTH –, and it has been observed that most of these terms are used as present and future tense adverbials. This means that WEEK, for instance, can be translated as ‘a week’, ‘last week’, or ‘in a week’. The context is essential to determine the meaning of the time term. Interestingly, there is a non-manual realisation of the meaning ‘the next day’, as the manual part of the sign DAY may be (or possibly has to be) dropped when expressing this meaning.

IUR has only one monomorphemic sign for a day of the week, SUNDAY. While this appears to be a striking feature at first sight, it becomes less surprising in light of the importance of Sunday in the formation of Inuktitut days of the week, which was explained in (10). One strategy to form signs for the days of the week is to use a list buoy on the non-dominant hand; another strategy is to incorporate a number in the sign DAY. In both strategies, MONDAY is seen as the first day of the week. This corresponds to the way the days of the week are formed in Inuktitut, as IUR, just like Inuktitut, numbers (some of) the
days of the week with respect to a reference point. It thus seems likely that this is an instance of borrowing.

Furthermore, neither Inuktitut nor IUR has a term for YEAR. In Inuktitut, the term for ‘winter’ may be extended to mean YEAR, or a borrowed term is used. In IUR, a reference to the changing of the seasons is also possible, but this occurred only once in the data. Again, the absence of this term may be due to an influence from Inuktitut. Without going into too much detail, I just want to point out that it seems likely that the absence of a term for YEAR is influenced by Inuit culture, where traditionally this concept has only played a minor role.

Several temporal adverbials in IUR reflect patterns that have been described for Inuktitut. First, the sign TODAY and Inuktitut manna (described in (6) above) both have a spatial and a temporal interpretation. Second, and even more interestingly, I observed the use of the same metaphor for time reference – one that is cross-linguistically unusual. The two signs LONG-AGO-1 and LONG-AGO-2, which both refer to a past long gone, have contrasting movement paths (forward vs. backward), which shows that the past is not consistently conceptualised as lying behind the signer (time line A). The behaviour of these signs, however, shows parallels with Inuktitut aniguqtuq given in (9) above. In the IUR signs, as well as in the Inuktitut term, the past is conceptualised as being away from the speaker, in any direction. This is a reflection of the perception of time by hearing Inuit as described in section 3.3.2. The Inuit perceive time as a ‘place of opportunity’, as a succession of events. In IUR, this seems to be expressed by the non-fixed orientation of past in these two signs. It thus appears that one metaphor of time reference among the Inuit is found.

However, in addition, IUR makes use of a time-line that does not have a flexible orientation. The signs NEXT-DAY, DAY-AGO, and PAST are located on a time-line in front of the signer which runs from left to right, horizontally in front of the signer’s upper body (time line B). The past is located to the left and the future to the right, as can be clearly seen in the contrasting movements of NEXT-DAY (i.e. rightward) and DAY-AGO (i.e. leftward). In this respect, IUR patterns with other sign languages, for which this time-line has also been described.

For most urban sign languages, as well as for most spoken languages for that matter, space is used to talk about time. In sign languages, this metaphorical use of space is commonly visualised by means of time-lines, on which time adverbials are located. Time adverbials related to the future often move forward on these time-lines, while time adverbials related to the past move backward. The signer’s body is connected to the present, meaning that time adverbials related to the present are located near or on the signer’s body. As described in section 3.3.3, three time-lines have been described for many urban sign languages, but not all have been found in IUR. In fact, based on the data, only time-line B can be identified with certainty. IUR thus patterns with urban sign languages with respect to the use of this one time-line, but with Inuktitut with respect to the general perception/conceptualisation of time.
3.4. Numbers

3.4.1. Universals and general properties of number systems

In many languages, the base for numbers is the human body (Greenberg 1978; Hurford 1975). Consequently, common numeral systems are base-5, base-10, and base-20 systems, as they may be based on the five fingers of a hand, on the ten fingers of two hands, or in some cases on the ten fingers plus ten toes. Other numbers that play important roles in number-naming systems across languages are the numbers 1 and 2.

Greenberg (1978) posited 54 generalisations about numeral systems, including several concerning the internal ordering of numeral expressions, the arithmetical operations concerned, as well as regarding the syntax of numeral expressions. A discussion of all of these generalisations is outside the scope of this thesis, but the most relevant ones are briefly discussed.

First and foremost, addition is used in almost all languages to form higher numbers, and, by implication, if multiplication is used in a language, addition is also used (Greenberg 1978:258). Consider, for instance, English: since multiplication in the multiples of ten is found (‘four-ty,’ ‘six-ty’; i.e. 4x10, 6x10), one should also find addition, which indeed occurs in the numbers 13-19, e.g. ‘seven-teen’ (7+10), as well as in higher units, e.g. ‘sixty five’ (6x10+5), ‘eighty nine’ (8x10+9).

Secondly, the ordering of the elements may differ across languages. The smaller addend may precede or follow the larger addend, and in several languages, both orders exist. However, if the latter is the case, there usually is a specific number at which the shift of order takes place. For instance, 16 in Italian is ‘se-dici’ (6+10), which leads me to assume that the smaller numbers are also ordered like this, which indeed they are. However, 17 is ‘diciasette’ (10+7). One should then assume that numbers higher than 17 also are ordered with the higher addend preceding the smaller one, and again, this is indeed the case.

According to a third generalisation, in numeral systems of languages, bases can be identified, and languages often have a set of bases. A number is a base if the next higher base is a multiple of this number, and if the numbers between these two bases are formed by addition or subtraction of this number (Hammerström 2010); according to this criterion, 10 is a base in many languages (e.g. English ‘six – six-ty – sixty-one’). Greenberg (1978) mentions an interesting characteristic for bases, namely that they may be deleted. He provides the example of Hausa, where deletion of 10 in the numbers 11-17 is favoured: thus e.g. góómà šáà dâyá ‘ten plus one’ simply becomes šáà dâyá, omitting ‘ten’ (lit. ‘plus one’). Another example given is that of Sidamo, an Eastern Cushitic language, where multiples of 10 were originally expressed by ‘plural form of number x 10’. Nowadays, the base 10 is commonly deleted, such that e.g. 50 is simply expressed by the plural of 5, 60 by the plural of 6, and so on, until 90.

Hammerström (2010) provides a survey of rarities in numeral systems and gives an overview of languages that have a numeral system based on other bases than those mentioned above. As for the latter, he lists some languages that have been claimed to have a base-3, base-4, base-6, base-8, base-12, or even base-15 system. Reports about some of those languages should be treated cautiously, however, as Hammerström (2010) provides counterevidence for some of them.
Besides cardinal numbers, ordinal numbers will also be considered in the description of IUR. Ordinals are generally marked in comparison to cardinals, and often based on the cardinal numbers (as e.g. English ‘four – fourth’). Also, in many languages, the lowest ordinals have a suppletive form, e.g. English ‘first’ and ‘second’ (Greenberg 1966)). In the next section on Inuktitut, however, only ordinal numbers are addressed, as no data concerning ordinal numbers was available.

### 3.4.2. Numbers in Inuktitut

As is common in many other cultures, “[f]or Inuit, the basic measuring standard is the human body with its ten fingers and ten toes” (Dorais 2010:144). It is thus not surprising that Inuktitut employs a base-20 system. The number 5 **tallimat** literally means ‘an arm is complete’, and the number 10 **qulit** means ‘the upper part’. In some dialects, 11 translates to ‘the upper part is put aside’, expressing the transfer from the fingers to the toes. In Table 3.5, some Inuktitut numbers are given. The numbers 1 to 5, as well as 10 and 20, are still used. For higher numbers, however, many Inuit use the English numbers (Dorais 2010). In Inuktitut, higher numbers involve addition or multiplication. 100, for instance, is **avatit tallimat**, thus a combination of 20 and 5. Denny (1981; in Dorais 2010) suggests that traditionally, hunters did not need high numbers, since the concrete context did not require them, as usually only relatively few animals were killed.

**Table 3.5**: Some Inuktitut numbers (after Dorais 2010:145).

<table>
<thead>
<tr>
<th>nr</th>
<th>Inuktitut numbers</th>
<th>Literal translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>atausiq</td>
<td>‘adherence, what is indivisible’</td>
</tr>
<tr>
<td>2</td>
<td>malruk</td>
<td>‘the following unit’</td>
</tr>
<tr>
<td>3</td>
<td>pingasut</td>
<td>?</td>
</tr>
<tr>
<td>4</td>
<td>sitamat</td>
<td>?</td>
</tr>
<tr>
<td>5</td>
<td>tallimat</td>
<td>‘an arm is complete’ (from taliq ‘arm’ (^\text{16}))</td>
</tr>
<tr>
<td>6</td>
<td>arvinilik</td>
<td>‘there is a passage’</td>
</tr>
<tr>
<td></td>
<td>pingasujuqtut</td>
<td>‘they are three once again’</td>
</tr>
<tr>
<td>10</td>
<td>qulit</td>
<td>‘the upper part’</td>
</tr>
<tr>
<td></td>
<td>tallimaujuqtut</td>
<td>‘they are five once again’</td>
</tr>
<tr>
<td>20</td>
<td>avatit inuinnaq</td>
<td>‘the limbs’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘one person’</td>
</tr>
</tbody>
</table>

It is important to briefly address the Inuit way of counting on the hands, as it may be expected that this has influenced the creation of number signs. I observed that Inuit people

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\(^{16}\) Please note that Inuktitut has a separate word for ‘hand’, **aggak**.
start at the little finger, which would represent ‘the first’. Adding the ring finger means ‘second’, and the middle finger would be ‘third’. The index finger would be ‘fourth’, while the thumb would be ‘the fifth’. It is possible to point to these extended fingers with the index finger of the other hand. Obviously, for the numbers 6-10, this pointing strategy is not available, as for these numbers, people add the other hand, again starting at the little finger.

3.4.3. Numbers in sign languages

In many, if not all sign languages, the numbers 1-5 are iconic as each finger represents a unit. The order of adding units, however, may differ across sign languages, as well as the starting unit. In Table 3.6, the numbers 1-5 of three sign languages are pictured. ASL and NGT start counting at the index finger, while French Sign Language (LSF) starts at the thumb. Number 3 in ASL and LSF are identical, in contrast to number 3 in NGT. Coincidentally, numbers 4 and 5 are identical in all three sign languages.

In contrast, numbers above 5 are not always an iconic representation. Numbers 6-10 are only iconic in two-handed systems, in which fingers of the non-dominant are used to add units, as can be seen in the LSF numbers 6-9 in Table 3.6. In NGT and ASL, on the other hand, these numbers are one handed, and the fingers thus do not iconically represent the units indicated. These sign languages therefore have nine different handshapes for the numbers 1-9, while in two-handed number systems, only five different handshapes are found, distributed over the two hands.

Table 3.6: Numbers 1-10 in three sign languages. ASL numbers from Lifeprint.com; LSF numbers from 2as.org

<table>
<thead>
<tr>
<th>nr</th>
<th>ASL numbers</th>
<th>LSF numbers</th>
<th>NGT numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image" alt="ASL 1" /></td>
<td><img src="image" alt="LSF 1" /></td>
<td><img src="image" alt="NGT 1" /></td>
</tr>
<tr>
<td>2</td>
<td><img src="image" alt="ASL 2" /></td>
<td><img src="image" alt="LSF 2" /></td>
<td><img src="image" alt="NGT 2" /></td>
</tr>
<tr>
<td>3</td>
<td><img src="image" alt="ASL 3" /></td>
<td><img src="image" alt="LSF 3" /></td>
<td><img src="image" alt="NGT 3" /></td>
</tr>
<tr>
<td>4</td>
<td><img src="image" alt="ASL 4" /></td>
<td><img src="image" alt="LSF 4" /></td>
<td><img src="image" alt="NGT 4" /></td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="ASL 5" /></td>
<td><img src="image" alt="LSF 5" /></td>
<td><img src="image" alt="NGT 5" /></td>
</tr>
</tbody>
</table>
10 appears to be a special number. None of the signs for 10 in Table 3.6 is an iconic representation of the units indicated, but other systems may make use of a two-handed number 10, with all fingers extended.

AdaSL shows some interesting features in the signs for numbers below 10. Numbers 1-3 are clearly iconic, in contrast to 4 and 5 which may be argued to be iconic, too, but in a less straightforward way (Nyst 2007). FOUR is signed with the fingers extended and adducted, and the thumb extended as well (something like the $\leftarrow$-handshape). Assuming that the four fingers represent the number and ignoring the thumb, this sign is iconic – but in a different manner than in 1-3. FIVE is formed by a $\leftarrow$-hand, and can be argued to constitute yet another type of iconic representation, as the five closed digits may represent the number 5. Note that this form is also used as a co-speech gesture in the surrounding community, as well as in other parts of Africa. For the numbers SIX, SEVEN, and NINE, this handshape is the base, and grabs one, two or four fingers of the non-dominant hand. EIGHT is formed by doubling FOUR, and TEN by doubling FIVE. The AdaSL number system is thus somewhat unusual in its irregularity (Nyst 2007).

Studies on BSL and NZSL reveal that variation between one- and two-handed number systems may also be found within a single sign language, the variation being influenced for the most part by sociolinguistic factors such as age and region (Skinner 2007; McKee, McKee & Major 2011).

In several sign languages, numbers 11-19 are formed by adding a movement to the numbers 1-9, although 11 and 12 may be exceptions (just as they are in some spoken languages). Since these signs include a movement, they are much harder to capture in a picture. The LSF signs for 11-19, for instance, have the same handshapes as the numbers

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The sign TEN in NGT is one-handed, and involves a twisting movement at the wrist.
1-9 in Table 3.6, but include an upward movement (Companys & Tourmez 2000). In NGT, the number signs 13-19 involve a circular movement using the handshapes of the numbers 3-9. Similarly, the multiples of ten in these sign languages are based on the numbers 1-9, again with a specific movement added (for instance, an outward movement in NGT).

As in many spoken languages (Greenberg 1978), higher numbers are commonly formed by the addition and/or multiplication of lower numbers, rather than by subtraction or division (Nystr m 2007). In BSL, for instance, TWENTY^FOUR is used, while in NGT FOUR^TWENTY. Both systems involve an additive strategy. Interestingly, the order mirrors that found in numbers in the surrounding spoken languages: English ‘twenty four’ and Dutch vier-en-twintig, lit. ‘four-and-twenty’.

Number systems have been analysed for some sign languages and base-5 structures and base-10 structures have been found. French-Belgian SL, for instance, has a base-5 structure (Leybaert & Van Cutsem 2002), while ASL has a base-10 structure (Steinbach 2012). Furthermore, both DGS and BSL make use of a base-10 structure, with a sub-base of 5 (Steinbach 2012; Skinner 2007). One aspect that appears to be missing, however, is a clear description of how the base is determined.

Other interesting irregularities are found in Alipur SL, a village sign language from India, and Mardin SL, a “deaf family” sign language from Turkey. Alipur SL shows a subtractive system. 28, for instance, is signed TWO LESS THREE (where THREE stands for 30), and 195 is signed FIVE LESS TWO (where TWO stands for 200). While most sign languages show a base-10 system, Mardin SL from Turkey has a base-20 system, in that 40 is 20x2, and 60 is 20x3 (Zeshan 2010).

In some sign languages, the number signs are derived from gestures that are used in the wider culture, while in other sign languages, this is not the case. For ASL, for instance, Fischer (1996) describes how the number signs have their origin in both American conventional gestures as well as the Old LSF number system that was brought to the USA by Laurent Clerk. In contrast, NGT number signs differ from Dutch gestures. When using their fingers while counting, hearing Dutch people would generally start with the thumb to represent 1, adding the index finger for 2, the middle finger for 3, the ring finger for 4, and the little finger for 5. In NGT, however, ONE is signed with the index finger, TWO by adding the middle finger, etc. (see Table 3.6). Numbers 6 to 10, are different, too, as a Dutch gesturer would use two hands to indicate these numbers, while in NGT, the corresponding signs are one-handed.

These cardinal numbers form the base of ordinal numbers, just as in spoken languages, and they may incorporate in lexical signs. Numeral incorporation has been reported for many sign languages, and it usually involves the incorporation of number signs into signs for time expressions, age, and currency, as well as pronouns (inter alia Liddell 1996; Steinbach 2012). In these cases, the handshape of the base sign changes to that of the corresponding number handshape. In BSL, for instance, the sign THREE-POUND is one single sign. In the underlying sign POUND, a handshape moves forward from the chin. In THREE-POUND, the handshape is replaced by the number THREE (Sutton-Spence & Woll 1999:105).

Finally, in my discussion of IUR, ordinal numbers in the form of list buoys will also be important. Buoys are signs that are held stationary on the non-dominant hand while the dominant hand continues producing signs (Liddell 2003). List buoys are buoy signs...
representing a number of referents, and in most cases, the corresponding numeral signs are used for this purpose. Furthermore, list buoys in ASL, Swedish SL, and Norwegian SL have a different orientation compared to the numeral signs (Liddell, Vogt-Svendsen & Bergman 2007). They function as a sort of visible list used in discourse, for instance indicating a number of children or a number of cities. In (14), an example from NGT is given to illustrate the use of list buoys. The signs glossed as COUNT-ONE, COUNT-TWO and COUNT-THREE are the buoys: the index finger of the dominant hand makes contact with the appropriate number which is signed by the non-dominant hand. That is, the fingers are unfolding one after the other and the dominant index first touches the non-dominant index, then the middle finger, and finally the ring finger.

(14) THREE PERSON++ COUNT-ONE MAN COUNT-TWO WOMAN COUNT-THREE MAN

‘There are three people, the first is a man, the second a woman, and the third a man.’

3.4.4. Numbers in IUR

I now turn to IUR to see how the IUR number system compares to those previously described for other sign languages and the system used in Inuit culture and Inuktitut. I first look at cardinal numbers (3.4.4.1), followed by a description of the ordinal numbers (3.4.4.2). In the last section (3.4.4.3), numeral incorporation in IUR is addressed.

3.4.4.1. Cardinal numbers

IUR numerals are clearly derived from the gestures that hearing Inuit use. For the numbers 1 to 3, two variants were found that depend on which finger is selected to express ONE. The first variant, shown in the first row in Figure 3.18, selects the little finger for ONE, as can be seen in the top left picture (ONE-1). The signs TWO-1 and THREE-1 then add the ring finger and middle finger, respectively. In contrast, the other variant starts with the index finger (ONE-2) and then adds the middle finger for TWO-2 and the ring finger for THREE-2, as can be seen in the second row in Figure 3.18. A comparison of the two rows reveals that the numbers four and five are identical in both variants.

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<td>ONE-2</td>
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Figure 3.18: Numbers 1-5 in variant I (first row) and variant II (second row).
Though both variants are used regularly both in gesturing and in IUR, variant I is regarded as more traditional. The only restriction on the use of the variants is found in enumeration, where only the more traditional variant I is used. This will be explained in more detail in section 3.4.4.2 on ordinal numbers.

In both variants, the hand is usually oriented as pictured in Figure 3.18, with the palm of the hand towards the signer. Occasionally, for instance, when a signer is trying to remember an exact number, the palm is orientated away from the signer and slightly downwards.

In both variants, the signs for numbers SIX to TEN are two handed, and are pictured in Figure 3.19. In Inuit culture, it is common for the two hands to make contact in counting, and this occurs in IUR as well, as can be seen in the signs SEVEN and NINE in Figure 3.19, where a finger of the dominant hand makes contact with the thumb (alternatively, the little finger) of the non-dominant hand (expressing ‘five’) to form the number. This strategy has been observed for numbers SIX to NINE, but is only pictured for SEVEN and NINE here. Furthermore, TEN has two variants, one of which (TEN-2) is characterised by contact between the two hands at the fingertips, as shown in Figure 3.19. Contact between the hands might be motivated by the literal meaning of the Inuktitut words for ‘six’ and higher, as Inuktitut has a base-5 number system. Arvinilik ‘six’ literally means ‘there is a passage’ (see Table 3.5), and in IUR this meaning might be reflected by contact between the hands (i.e. a passage to the other hand).

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**Figure 3.19:** Numbers 6-10.

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It is worth noting that some IUR signers use the ASL numbers for 6-10 when talking about years (dates) and time. Borrowing from ASL will be further discussed in section 5.3.3.

Although Greenberg’s (1978:255) third generalisation states that “[z]ero is never expressed as part of the numeral system”, it is worth mentioning that IUR has a sign ZERO, which is illustrated in Figure 3.20. This sign is used in the formation of multiples of 10, as well as in 100 and 1000.
In IUR, no lexical signs exist for numbers higher than 10, and there are two strategies to express these. The first is an additive strategy, using TEN to form the numbers 11-20, and the multiples of 10. Only addition with TEN-1 was found in the spontaneous texts, but informant PU told me that it is also possible to use TEN-2, especially to form the multiples of 10. However, the more common strategy is to form these multiples of 10 by juxtaposition, combining the numbers 0-9. Both strategies can be seen in (15), where 60 is signed as SIX^ZERO (i.e. juxtaposition strategy), while 15 employs the additive strategy by adding FIVE to TEN-1.

(15) SIX^ZERO PAY GAS TEN-1^FIVE EXPENSIVE
   ‘One pays 60 dollar for 15 gallons of gas, so expensive!’

No signs exist for 100 and 1000. As most numbers above 10, these are formed by juxtaposing the numbers 0-9. In (16), this is illustrated for 1000 and 900.

(16) PAST PRO1 ONE-2 COMMA ZERO^ZERO^ZERO FINISH FIVE NEVADA-TICKET. PRO1 MONEY NINE^ZERO^ZERO THROW_{airport}
   ‘Before, I won 1,000 dollar from five Nevada tickets. I paid 900 to the airport.’

It is interesting to note the COMMA inserted in 1000 in (16). Actually, this strategy is always used in numbers above 1000 in IUR. This supports the assumption that IUR numbers are representations of written numbers, an assumption based on the occurrence of juxtaposition such as 156 in (17).

(17) CHISEL MONEY EXPENSIVE ONE-2^FIVE^SIX
   ‘The chisel was expensive, 156 dollar.’
3.4.4.2. Ordinal numbers

There is a small set of ordinal numbers, which are formed by pointing to the extended fingers of the non-dominant hand. The numbers used in such enumeration sequences are always the more traditional numbers of variant I, i.e. ONE-1, TWO-1, and THREE-1 (see Figure 3.16). When used in enumeration, the non-dominant hand takes on the function of a buoy, that is, the dominant hand points to (and possibly touches) the finger associated with the appropriate ordinal, for instance, to the little finger to indicate ‘first’. The other fingers of the hand may either be extended or closed. Ordinals thus differ from the cardinal numbers in that the non-dominant hand indicates the number; given that their form is similar to that of buoys (see example (3) for instance), ordinals are glossed with COUNT, just like buoys. This also implies that the highest ordinal that can be expressed in this way is ‘fifth’. These ordinals can only be used in lists, as illustrated in (18.a); they cannot be used in isolation to refer back to a member of the list, without repeating the referent. Consequently, it is impossible to sign a sentence like (18.b) as a continuation of (18.a). This is confirmed by the informants, who judged this sentence, and others like it, as being deviant in IUR. Cross-linguistically, this pattern is striking, as most sign languages allow this strategy.

(18) a. COUNT-ONE FEMALE PERSON COUNT-TWO PRO1 FEMALE ELDER COUNT-THREE PRO1
     _fr
     COUNT-FOUR--hold DEAD
     ‘The first one was my sister, the second one my mother, the third one me, and
     who was the fourth one? Oh, he had passed away.’

     b. *COUNT-ONE GO ICE-FISH
     ‘The first (i.e. the sister) went ice fishing.’

3.4.4.3. Numeral incorporation

Numeral incorporation in IUR is only possible with the time expressions DAY and WEEK (see section 3.3.4.1 for a description of these lexical signs), which allow incorporation of the one-handed numbers 1 to 5. For the numbers 1-3, both variants (see Figure 3.16) may undergo incorporation, but signers have a preference for consistently using one of the numeral variants with DAY and the other one with WEEK. As shown in Figure 3.21, variant I (i.e. the more traditional variant which starts with the little finger) is preferred for DAY. Remember from the discussion in section 3.3.4.1 that DAY is articulated with a ꝙ-hand at the side of the face, with a small forward movement.
In section 3.3.4.1, I pointed out that it is possible to drop the manual part of \textit{DAY}. It is also possible to combine the non-manual part of \textit{DAY} (eyes closing and opening, slight head tilt) with a number sign. In this case, the number sign is generally articulated in neutral space rather than close to the face.

In contrast to \textit{DAY}, \textit{WEEK} usually incorporates the forms of variant II (i.e. the variant which starts with the index finger). As was pictured in Figure 3.13, \textit{WEEK} is signed with a \textbullet hand moving from left to right in neutral space. In Figure 3.22, \textit{FOUR-WEEK} is pictured, in which the number \textit{FOUR} has replaced the \textbullet handshape.

Remember that the lexical signs \textit{DAY} and \textit{WEEK} are not only used to denote a period of time, but may also function as future time adverbials, taking on the meaning of ‘in a day’ and ‘in a week’ (section 3.3.4.1). This is also true for these signs when a number has been incorporated.

As has been described for other sign languages, too, numeral incorporation is an optional process. This was not only obvious from the spontaneous data; the informants also stressed that the incorporated and the analytical version have the same meaning, when I discussed time terms during an interview session. In (19), both options are illustrated. In (19), no incorporation is used, but \textit{WEEK} is duplicated to express the dual, while in (19), the number \textit{THREE-2} is incorporated (but still also signed separately preceding the incorporated form).
(19)  a.  PRO₁ THINK ONE-2 TWO-2 WEEK WEEK PRO₁ ICE-FISH GOₐ INDEX-LOC₉
    ‘I think in one or two weeks, I will go ice fishing there,a or thereb.’

    b.  TWO-2 THREE-2 THREE-WEEK PALMS-UP WARM MOVE:EC₃ GOOSE
    ‘In two or three weeks, I’m not sure, but when it’s warmer, the geese will come.’

Note that in both examples in (19), the signer is unsure about the exact number of weeks. Still, incorporation is an option, as is evident from (19.b).

3.4.5. Discussion

In section 3.4.1, I introduced some typological patterns that have been identified for numeral systems in spoken languages; beyond these patterns, however, no clear typological classifications have as yet been proposed. In section 3.4.3, I described several strategies for forming numbers in sign languages, on the basis of which some typological tendencies could be identified. Many sign languages use dedicated strategies for 11-19, as well as for multiples of ten. Furthermore, it is very common for sign languages to employ additive strategies for signs that combine the multiples of ten with the units, and have lexical signs for a hundred, a thousand, and a million. This is very different from what I found in IUR, where a juxtaposition strategy is favoured. Whereas in many urban sign languages, 123 would be signed as HUNDRED^TWENTY^THREE, in IUR only the units are used, creating ONE^TWO^THREE. The only additive strategy found in IUR applies to the signs 11-15, which combine TEN and a unit.

Based on the available data from IUR as well as from other sign languages, at least three typologies for sign language number systems can be suggested. The first typology is based on the finger selection for ONE. Theoretically, five typological systems should be possible, as each of the five fingers could be selected for ONE. In reality, however, only three of these systems are actually attested in sign languages: ONE is signed with an extended index finger, with an extended little finger, or with an extended thumb. The fact that systems that would realise ONE with either the middle or ring finger are not attested is not surprising given that, to the best of my knowledge, such systems are also not found in gestural counting. Obviously, counting systems – be they gestural or part of a sign language – select a side of the hand (radial or ulnar) as starting point, and given that the thumb may be folded in (i.e. opposed), the index finger may also be treated as a side of the hand. With respect to this first typology, IUR falls into two classes, as it has two variants for ONE. The co-existence of two (or more) systems within a single sign language has also been described for other sign languages, but as McKee et al. (2011) argue for NZSL, the choice of a particular system is usually determined by sociolinguistic variables. In contrast, IUR employs two different systems for the numbers 1-3 which are used interchangeably in spontaneous signing, although one system (variant I) is considered more traditional and certain preferences exist when it comes to numeral incorporation into the signs DAY (variant I) and WEEK (variant II). The fact that, besides these incorporation preferences, all
signers interviewed use both variants interchangeably, appears to be a rather unique feature of IUR.

In all systems described to date, the number signs for 1-5 are one-handed. A second typology, however, could be based on the articulation of the numbers 6-10. There are two typological classes, as the number signs for 6-10 can either be one-handed or two-handed. IUR belongs in this latter category, which can be considered more iconic.

Thirdly, it should also be possible to classify sign languages in terms of the base used for their numeral system. Further criteria are needed in order to establish such a typology, as I think a definition of what counts as a base is needed, especially with respect to base-5. For instance, if 6 is formed with two hands, whereby the non-dominant hand contributes 5 by extending all fingers, would we want to classify this as a base-5 system, or would we only want to label other handshapes that refer to 5 as base? Does a base-5 system require any alteration of the number FIVE, as has been described for a variety of BSL (Skinner 2007; Schembri 2010)? How would we deal with a covertly expressed base-5? More research and comparative studies are needed to answer these questions. Given these uncertainties, I cannot clearly identify a base-5 system for numbers 6-10 in IUR.

With respect to base-10 systems, this can be described in terms of morphophonology, similar to what I argue for verb agreement in Schuit (2007, see section 1.1.3.2). The movement patterns of the multiples of 10 found in many sign languages are clearly identifiable phonemes with morphological status. That is, these movements are phonomorphemes. Identifying a base-10 in sign languages is thus more straightforward than identifying a base-5. For IUR, the use of both varieties of TEN in 11-20, and the multiples of 10, suggest a base-10 system. However, it should be noted that the juxtaposition strategy is highly favoured.

3.5. Discussion and conclusions

In this chapter, kinship, colour and time terminology as well as numbers in I UR were discussed and compared to patterns previously described for spoken languages and other sign languages. In all four domains, IUR has been found to show cross-linguistically unusual features, and in some of them, it actually displays patterns that suggest a reconsideration of some of the proposed universals. IUR thus contributes to the general understanding of the typological variation attested within certain semantic fields.

With respect to kinship terminology, IUR provides counterevidence to one of Greenberg’s (1966) proposed universals, as IUR does not have separate signs for MOTHER and FATHER. Furthermore, IUR is quite unusual in having only three kinship terms, namely ELDER, SIBLING, and SPOUSE. Other kinship terms are expressed by the signs MALE and FEMALE alone, or by combining the three kinship terms with one of these. Actually, in discourse, MALE and FEMALE may extend their meaning to most male and female relatives. This semantic extension was not considered a form of kinship terminology as the interpretation of the terms is highly context-dependent. It is interesting that IUR has only three kin terms, while Inuktitut has an extensive kinship terminology system, reflecting the importance of family relations in Inuit culture. Inuktitut thus has not
had any influence on IUR kinship terminology. In other areas, Inuktitut did have an influence on IUR, as will be discussed further in section 5.3.3.

The consideration of colour terms in sign languages reveals that Berlin and Kay’s criteria for the assessment of basic colour terms need to be reconsidered in light of the strategies commonly employed in sign languages, especially when it comes to the use of pointing signs. In analysing the IUR data, I considered pointing signs that consistently point to the same referent to be basic colour terms. IUR thus has two basic colour signs, namely BLACK and RED. No other colour signs exist, probably resulting from a rare use of colour reference in general. Again, this is an interesting finding, as the lack of a term for WHITE violates the implicational hierarchy proposed by Berlin and Kay (1969) according to which the existence of a term for RED implies the existence of terms for BLACK and WHITE.

As for time expressions, I found that IUR complies with the general pattern, described for signed and spoken languages, that all languages use spatial metaphors for the expression of time. In most languages, the future is conceptualised as lying ahead while the past is taken to be located behind the speaker/signer. In many sign languages, this metaphor is rather literally expressed by time-lines. In IUR, however, the only time-line found is the one in front of the signer moving from left to right. Interestingly, the signs LONG-AGO-1 and LONG-AGO-2 reflect the Inuit cultural idea that the past is located away from the signer. In this domain, IUR is not really exceptional, since it provides no counterevidence to a proposed universal – as there are no real universals regarding the metaphorical expression of time. Still, IUR is somewhat unusual as it employs two opposing signs for LONG-AGO. However, a similar metaphorical use of ‘away/beyond’ for past tense reference is found in Inuktitut.

IUR has two variants for the number signs 1-3 that depend on the finger selection for the sign ONE: either the index (variant I) or the little finger (variant II) may be used for ONE, and the subsequent numbers follow this selection by adding a second and third finger adjacent to the first. Both variants are used in number incorporation, but only variant II is used in enumeration. Several typologies were suggested with respect to sign language number systems, and IUR can be classified based on the two variants, as well as based on the two-handed expression of the numbers 6-10. I explained the difficulties in deciding what counts as a base-5, and that determining a base-10 system was more straightforward based on phonomorphology. Interestingly, the two variants for the numbers 1-3 are used by all signers, and do not depend on sociolinguistic factors like region or age.

It might be assumed that people who share a culture would also share a set of semantic terms. The evidence discussed in this chapter, however, suggests that this is not necessarily the case. In fact, comparing Inuktitut to IUR, it turns out that the two languages show some overlap within the domain of time reference, as both metaphorically extend spatial expressions to the domain of time. A probable explanation for this overlap is the fact that the notion of lineal time is relatively new to the Inuit, and thus not a traditional part of their culture. Further overlap is found in the area of numbers: I have suggested that the manual representation of the number 6 in IUR (in which the both hands make contact) makes reference to the Inuktitut word arvinilik (‘six’), which literally means ‘there is a passage (to the other hand)’. In contrast, IUR and Inuktitut hardly show any overlap in the domains
of colour and kinship terms. It is interesting that the spoken and the sign language used within the same cultural group do show so few similarities in their terminology relating to certain semantic fields, which have always been taken to be rooted within a culture. One may speculate that the differences result from the fact that both languages have been under different influences, possibly because of the different experiences of hearing and deaf Inuit. That is, the deaf person’s perception of cultural values and certain experiences may be different from that of the hearing Inuit, and therefore they may focus on different aspects, which in turn is reflected by quantitative and qualitative differences in the lexical expressions their languages make available.

Taking stock of the semantic domains I investigated, it is very interesting to note that in all of them, IUR is comparably poor, not only compared to Inuktitut, but also compared to other sign languages. At least partly, this pattern may be explained by the frequent occurrence of pointing in the language, which has only been mentioned briefly as it was not a focus of this study. Because of the high level of context-dependency of IUR, an apparently simple pointing sign may have considerable semantic load, and this is understood by many, if not most, signers in the community. The fact that IUR is used in small communities affords an increased and wider use of pointing signs – a feature that will also become relevant in the next chapter.