ON THE SYNTAX OF SPATIAL ADPOSITIONS IN SIGN LANGUAGES

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1 Introduction[1]

In investigations of sign language grammar – phonology, morphology, and syntax – the impact of language modality on grammar is a recurrent issue. The term 'modality', as used in this context, refers to the distinction between languages that are expressed and perceived in the oral-auditive modality (i.e. spoken languages) and those that are expressed and perceived in the gestural-visual modality (i.e. sign languages). Since the 1960's, an impressive body of research on various sign languages has demonstrated that many aspects of sign language grammar are in fact modality-independent and that theoretical models that were developed on the basis of spoken language can thus also account for sign language structures (see Sandler & Lillo-Martin (2006) for an overview).

In this paper, we will claim modality-independence, at least from a structural point of view, for an area of sign language grammar that appears to be clearly shaped by the visual-gestural modality: the use of space in locative constructions. In the remainder of the introduction, we will address the use of signing space and sketch what a 'canonical' locative construction in sign language looks like.

1.1 On the Use of Signing Space

Despite a general consensus that many components of sign language grammar are modality-independent, there are still some aspects that appear to be shaped by the visual-gestural modality.

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As far as the lexicon is concerned, for instance, it has been noted that visual languages lend themselves more to the iconic (i.e. non-arbitrary) expression of concepts than oral languages (see Perniss et al. (2010) for a recent discussion). In the realm of grammar, the unique possibility of sign languages to make use of the so-called signing space in front of the signer's body is a case in point; this space can be used for encoding morphosyntactic features such as person and number and for establishing spatial relationships between referents.

The signing space plays a crucial role in, for instance, pronominalization and verbal agreement. Sign language pronouns are indexical pointing signs (usually with index finger extended) that target loci in signing space; these are either the loci of referents present in the discourse or loci that have previously been established for non-present referents. The same loci are employed in the expression of agreement. In a nutshell, across sign languages, certain verbs – the so-called 'directional' or 'agreeing' verbs – can be modulated such that their beginning and end points coincide with the same loci that are used in pronominalization. For example, in many sign languages, moving the verb sign GIVE from the addressee towards the signer yields the meaning 'you give to me' (see Lillo-Martin & Meier (2011) for arguments that these spatial modulations are in fact part of the grammar rather than extra-linguistic, gestural elements). Last but not least, loci in signing space also play a crucial role in locative constructions, that is, in the expression of spatial relationships that involve a Figure and a Ground, as will be detailed in the next section.

1.2 Canonical Locative Constructions in Sign Languages

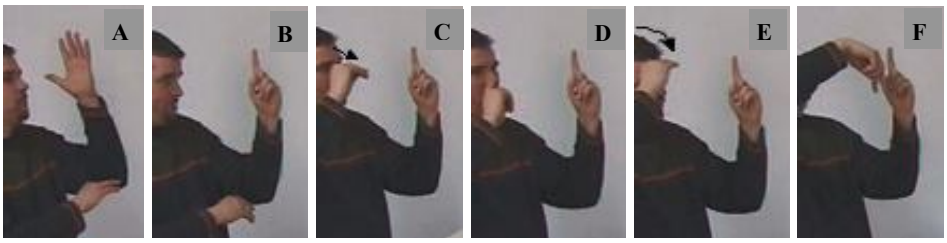
In the sign language literature, it is commonly assumed that sign languages lack spatial adpositions and that information about the spatial location of referents is encoded within the predicate by means of a spatial modulation of the predicate sign. For instance, in many sign languages, in order to express that an object (e.g. a book) is located on a table, the signer would generally start by articulating the sign TABLE (i.e. the Ground), followed by BOOK (the Figure), which in turn would be followed by the locational predicate. Crucially, the predicate will be modulated such that the endpoint of its movement coincides with the location in the signing space at which the Ground has been articulated, thereby yielding the complex meaning 'be located on the top/surface of'. No overt preposition is used.

Perniss (2007) observes certain regularities with respect to the (canonical) expression of Figure and Ground in locative relations across sign languages. First, in both spoken and signed languages, referents are typically introduced before information about them is predicated. This tendency, she claims, is due to a general modality-independent discourse property (i.e. Topic-Comment articulation). Secondly, in sign languages, the Ground object (e.g., the backgrounded, bigger, and immobile entity) is usually mentioned before the Figure object (e.g., the focal, smaller, and more mobile entity) in the locative construction (see Emmorey (1996) for American Sign Language (ASL) and Engberg-Pedersen (1993) for Danish Sign Language). Third, the handshape that represents the Ground (often referred to as 'classifier handshape') is commonly held in place while the other hand positions the Figure in relation to the Ground. That is, the locative construction is depicted by a two-handed simultaneous construction.

These canonical properties are illustrated by the German Sign Language (*Deutsche Gebärdensprache*, DGS) example in (1b) (Perniss 2007: 78; glosses slightly adapted); the stimulus picture which elicited (1b) is given in (1a).

(1) a.

b. [DGS]



rh: MAN BROWN SASS:HAT CL:MAN$_{loc(y)}$

lh: TREE CL(tree)$_{loc(x)}$----------

'A man with a brown hat is standing next to a tree, facing the tree.' [2]

(1b) can be considered canonical in the sense that (i) both referents (pictures A & C-E) precede the locative predicate (F); (ii) the Ground entity (A) is mentioned before the Figure entity (C-E); and (iii) a classifier handshape representing the Ground is held in space by the left hand (B-F) while the right hand signs the Figure and subsequently localizes the Figure in relation to the Ground (F). Such a simultaneous construction, in which the dominant hand continues signing while the non-dominant is held static in space, is referred to as a 'perseveration' (Miller 1994; Vermeerbergen et al. 2007).[3]

All of the static scene descriptions analyzed by Perniss (2007) depict entities that are localized next to each other, for example, a man and a tree (1a) or two men. Obviously, for scenes containing two identical entities, it is difficult if not impossible to determine which of the two functions as the Ground. In the following, we will therefore focus on situations in which the Ground entity can be unambiguously identified.

Despite the apparent modality-specific peculiarities of locative constructions, we will argue that sign languages employ the same syntactic machinery for expressing spatial relations as spoken languages do. In section 2, we start our investigation by taking a cross-linguistic

[2] Following common conventions, sign language examples are glossed in small caps. The two hands are glossed in separate lines, the upper line providing the gloss for the right hand (rh) and the lower line the gloss for the left hand (lh), When both lines contain the same gloss, we are dealing with a sign that is lexically specified for two hands (e.g. CHAIR in (14a)). Moreover, the following notational conventions are used:

SIGN$_{loc(x)}$	subscripts specify locations in the signing space; we use abstract variables instead of 'right' and 'left';
SIGN-------	the dashed line indicates that a sign is held in space with one hand (usually the non-dominant hand of the signer) while the other hand continues signing;
CL	classifier handshape, i.e. a handshape that represents certain semantic or shape characteristics of a referent; such handshapes are commonly used in spatial descriptions;
INDEX$_1$	indexical pointing sign towards the signer's body fulfilling a pronominal function ('I'; in NGT also used for 1st person possessive pronoun, see (24b)).
SASS	size-and-shape specifier, a sign which traces the outline or shape of an object.

[3] Note that the orientation of the right hand also indicates that the man is facing the tree since the back of the hand is commonly interpreted as the front of the person.

perspective on locative constructions in spoken languages. After a brief presentation of recent theoretical approaches to the category P in generative syntax, we conclude that the cross-linguistic data discussed here are compatible with Aboh's (2010) proposal that locative expressions generally involve a complex predicate structure including the Ground and its Part, which we label as P_2. The combination of the Ground and P_2 may be introduced by a directional verb or a 'be-located' functional element which we represent as P_1. These elements display distinct distributive properties and also differ with regard to their relative order with respect to the Ground. In section 3, we return to locative constructions in sign languages and show how the account defended in section 2 can be applied to languages in the gestural-visual modality. In essence, we show that the locative predicate is morphologically complex and includes subparts that correspond to P_1 and P_2. We conclude that the apparent modality-specific properties of locative constructions can and therefore should be captured by modality-independent machinery.

2 Spatial Adpositions in Spoken Languages

In the following sections, we use the term 'adposition' as a cover term for the category P. In generative work, this category is assumed to project in syntax where it is realized by pre- or post-positions depending on the language.

2.1 The Syntax of Adpositions

In many languages, spatial expressions are encoded by adpositions which may precede or follow the DP expressing the Ground. In the Germanic/Romance examples in (2), for instance, the elements *on*, *auf*, and *sur* are analyzed as prepositions.

(2) a. The cards are **on** the table [English]
b. Die Karten sind **auf** dem Tisch [German]
c. Les cartes sont **sur** la table [French]

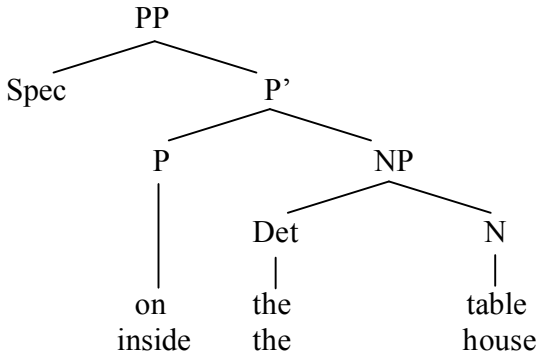
Other languages, however, employ postpositions, which follow the Ground DP, as illustrated by the Lezgian (Caucasus) example in (3a) (Haspelmath 1993: 218) and the Awngi (Ethiopia) example in (3b) (Hagège 2010: 292).[4]

(3) a. duxtur-r-in **patariw** fe-na [Lezgian]
doctor-PL-GEN to go-AOR
'She went to the doctors.'
b. ngə **da** aqi zekwa [Awngi]
house in man there.is
'There is a man in the house.'

[4] Instead of (or in addition to) adpositions, many languages use case markers (for at least some spatial relations), as illustrated by the Turkish examples *İstanbul-da* (locative case: 'in Istanbul'), *İstanbul-ya* (dative case: 'to Istanbul'); see Hagège (2010) for extensive discussion.

Traditionally, the adpositions in (2) and (3) are analyzed as heads of pre-/postpositional phrases; cf. the structure of an English prepositional phrase (PP) in (4). As for postpositions, one would either have to assume that the structure is head-final or, adopting Kayne's (1994) antisymmetry framework, that movement operations within PP apply that raise the Ground DP to a position preceding P.

(4)



More recently, studies by Koopman (2010), Svenonious (2003, 2006, 2010), and Den Dikken (2010) have drawn a parallel between PP structures and VP structures. In terms of these studies, Ps are predicative lexical categories which project a functional layer similar to that of verb phrases. Svenonius (2010: 144), for instance, argues that spatial adpositions involve the sequence in (5).

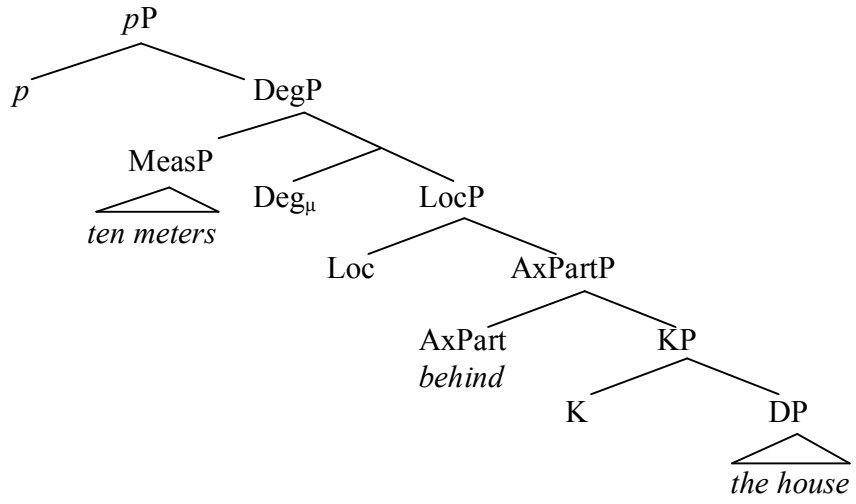
(5) p … Deg … Deix … Loc … AxPart … K … [DP …]

In terms of this analysis,

> the content material of spatial adpositions is distributed over a series of functional heads; for example, *between* combines a sense of interpolation, in *p*, with a sense of bifurcation in AxPart (presumably), contrasting with *among*, with the same sense of interpolation in *p* but a sense of compositeness rather than bifurcation lower down. Similarly, *near* expresses closeness in Deg, as does *beside*, but *beside* has distinct AxPart content. On the assumption that rich 'encyclopedic' or conceptual content can be associated with vocabulary items that are inserted under functional heads, there is no need for a special lexical root at the bottom of a sequence of functional heads. (Svenonius 2010: 144)

A major conclusion that arises from this analysis is that the structural make-up of spatial adpositions corresponds to distinct functional projections with specific semantics that project in a fixed hierarchical order. Accordingly, elements that are often referred to as pre- or postpositions actually represent spell-outs of one or a series of positions that they lexicalize. This is illustrated by the structure in (6), which stands for the sequence *ten meters behind the house*.

(6)



Under this analysis, morphologically complex adpositions (e.g., *behind*, *beside*), which express more than one categorical feature, are created by head movement (Svenonius 2010: 146). A crucial consequence of this analysis is that the distinct semantic notions expressed by adpositions are part of a functional domain that spans between *p*, which licenses the Figure, and K, the case head which takes the Ground DP as its complement. The analysis makes a number of strong predictions that have been shown to hold in Germanic and Romance. Yet, it leaves open certain questions two of which are relevant for the present discussion.

Given the analysis in (6), where adpositions belong to the *p*-K functional domain, it is not clear why elements expressing the Part of the Ground generally derive from relational nouns cross-linguistically, as opposed to adpositions encoding directions, which usually develop from verbs or other relators (e.g,. *outside* vs. *to* in English). In some languages, adpositions that derived from relational nouns are introduced by a possessive marker that appears sensitive to specifications of the Ground (see Aboh (2010) for discussion of Hausa). This is unexpected under the representation in (6), where K intervenes between the Part phrase and the Ground and should trigger minimality effects between AxPart and the noun embedded in the DP. Similarly, the sequencing in (5) and (6) suggests that there should be no situation where Loc-AxPart could be licensed in the absence of *p*-K. Put differently, a portion of the functional domain *p*-K cannot be licensed in isolation. If this were the case, the Figure could not be introduced and the Ground would fail to receive case. Yet, many languages involve locative expressions where location is expressed by the Ground as related to its Part, the two being licensed by a predicate, as in "we climbed the mountain top". It is not clear to us how such examples relate to (5) and (6) both in terms of word order and the absence of *p*.

Finally, adpositions deriving from relational nouns exhibit a different grammaticalization path from adpositions that developed from verbal or other predicative elements. This can be illustrated, for instance, in English, where *to* and *for* can function as complementizers contrary to *outside*, *beside*, and *above*, which cannot fulfill this function. This asymmetry appears consistent across languages and suggests that there might be a fundamental structural difference between these two types of adpositions. The structures in (5) and (6), however, ignore this distinction.

2.2 Complex Adpositions

Indeed, once we look beyond Germanic and Romance, we encounter locative constructions that cannot be accounted for in a straightforward way if we assume the structure in (6). In particular, in many African languages, spatial expressions systematically involve two adpositions (glossed in the following as P_1 and P_2). In the Gungbe (Kwa) examples in (7ab), the Ground-NP is framed by P_1 and P_2 while in the Zina Kotoko (Chadic) example in (8a), P_1 and P_2 precede the noun phrase. Finally, the Zina Kotoko example in (8b) shows that in this language, P_1 and P_2 can be separated by a genitive marker (Holmberg 2002: 164).

(7) a. Kɔ̀jó zé gò lɔ́ **ɖó** [$_{DP}$ àkpótín lɔ́] **kɔ̀n** [Gungbe]
Kojo take bottle DET P_1 box DET P_2
'Kojo put the bottle beside the box [lit. at the side of the box].'

b. Kpònɔ̀n lɛ́ nyì àgbàn cè **xlán** gbó **jí**
police PL throw luggage POSS P_1 garbage P_2
'The policemen threw my luggage on the garbage.'

(8) a. Kàrtà dé **a** **gmá** tábɔ̀l [Zina Kotoko]
cards DET P_1 P_2 table
'The cards are on the table.'

b. Ná fín Ádàm má fká **cə** mafù dé
I saw Adam P_1 P_2 Poss tree Def
'I saw Adam in front of the tree.'

Occasionally, the patterns exemplified in (7) and (8) are found in a single language. 18th century Sranan, for instance, displayed the contrast illustrated in (9ab) (van den Berg 2007: 131), where (9a) corresponds to the Gungbe examples in (7) while (9b) patterns like the Zina Kotoko examples in (8).

(9) a. Putti **na** tafra **tappo** [Sranan]
put P_1 table P_2
'Put it on the table.'

b. Putti **na** **tappo** tafra
put P_1 P_2 table
'Put it on the table.'

It is important to note that P_1 and P_2 differ formally in (at least) three respects (see Aboh (2010) for further discussion). First, elements of the class P_1 usually form a small class while elements of the class P_2 form a larger class. Second, as is evident from (10ab), both P_1 and P_2 can occur independently. It turns out, however, that P_2-elements can only appear in the context of a 'governor', be it P_1 or a verb (e.g. *bíɔ́* ('enter') in (10b)). Accordingly, the presence of P_1 is necessary for example (10c) to become grammatical (10d).

(10) a. Kòfí hɔ̀n [**sɔ́n** Xɔ̀gbónù] [Gungbe]
Kofi fled P_1 Xogbonou (=Porto-Novo)
'Kofi fled from Porto-Novo.'

b. Kòfí bíɔ́ [cɔ́fù lɔ́ **mɛ̀**]
Kofi enter shop Det P_2
'Kofi entered the shop.'

c. *Kòfí zé [távò lɔ́] [cɔfù **mɛ̀**]
Kofi take table Det shop P_2

d. Kòfí zé [távò lɔ́] [**sɔ́n** [cɔ́fù **mɛ̀**]]
Kofi take table Det P_1 shop P_2
'Kofi took the table from inside the shop.'

Third, closer inspection reveals that P_1 and P_2 realize the two types of adpositions mentioned in section 2.1: adpositions related to verbal or other predicative relators and those emerging from relational nouns. In Gungbe, P_1-elements generally develop from copulas or verbal predicates (Lord 1993). The element *ɖó* in (7a), for instance, is related to the verb *ɖó*, which is translated as 'have' in (11).

(11) Kɔ̀jó **ɖó** kwɛ́ [Gungbe]
Kojo have money
'Kojo has money.'

In contrast, elements of type P_2 generally derive from nouns expressing body parts or landmarks; see (12) for the diachronic development of the P_2-elements *kɔ̀n* and *jí* from examples (7ab) (Aboh 2005, 2010).

(12) a. Ònùkɔ̀n ('forehead') → nù-kɔ̀n ('in front of') [Gungbe]
→ kɔ̀n ('beside') → (7a)

c. Òjí ('heaven') → jí ('above') → (7b)

The data in (7) and (8) suggest that locative expressions might involve a more complex syntax than the rigid sequencing of semantic notions offered by the structures in (5) and (6). Indeed, it appears that even in Germanic and Romance, bipartite adpositions, that is, morphologically complex (13a) or phrasal (13b) prepositions, are not uncommon.

(13) a. John put the bottle **in-side** the box [English]
b. L'arbre est **à-côté-de** la maison [French]
'The tree is next to the house.'

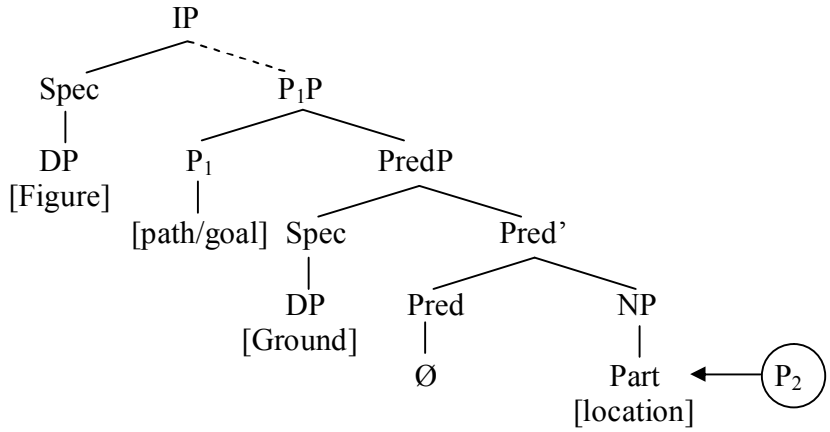
Again, as we suggested for the data in (10), while both English *in* and French *à* and *de* can occur on their own (14a), the same does not hold for the elements *side* and *côté*, respectively (14b).

(14) a. John put the bottle in the box / Mon frère vit à Paris
b. *John lives side Paris / * Mon frère vit côté Paris

For the examples in (14b) to be grammatical, an element of the type *in* or *à* is required.[5] Accordingly, elements of the type *side* or *côté* behave similarly to elements of the type P_2 presented before, while *in* and *à* behave like elements of the type P_1.

It thus seems that complex prepositions in Germanic/Romance have a certain resemblance to those observed in West African languages. We suggest to take this resemblance seriously and to analyze the former on a par with the latter. To that end, we adopt Aboh's (2010) idea that spatial expressions involve a complex predicate phrase embedded under an element P_1, which encodes path (or goal), and has been shown to generally emerge from verbal predicates or relators. While we use the label P_1 for a cluster of spatial specifications, our analysis is compatible with suggestions in Koopman (2010), Svenonius (2003, 2006, 2010), and Den Dikken (2010), as well as much related work, where P is sequenced into distinct semantic layers that form its functional domain. In contrast, we believe that the element encoding Part does not belong to this sequence. Instead, we propose that it is realized as a component of the predicate structure involving the Ground. Informally, the constituent containing the Ground and its Part is comparable to a possessive predicate in which the Part specifies a specific location with respect to the Ground as in *mountain top*, which refers to *the top of the mountain*. The Part-NP may further grammaticalize into a P_2-element, which under Aboh (2010) should be formally distinguished from the category P (if any). This explains why these adpositions commonly derive from nouns (Heine & Kuteva 2002). We refer the interested reader to Aboh's (2010) own work for further discussion. In the remainder of this paper, we adopt the relevant part of the structure as given in (15).

(15)

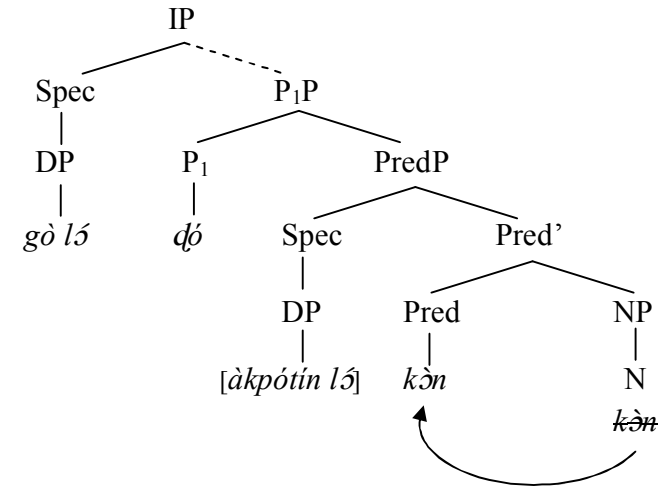


Let us consider again the Gungbe example in (7a). In this example, P_1 *ɖó* encodes path and selects a predicate phrase inside which the reference object *àkpótín lɔ́* (DP) is the subject, and its part expressing location represents a bare noun phrase headed by *kɔ̀n*. The latter subsequently

[5] There is a usage in French whereby *côté* can appear without an element of the type P_1 (e.g., *à*). In a library, for instance, the receptionist can answer a question saying: *Vous trouverez cet ouvrage côté linguistique* (lit. 'You will find that book side linguistics' = 'You will find that book in the location of linguistics books'). Similarly, in a context of a house that is being painted, one of the painters could say *Bon je prends côté nord et toi tu prends côté sud* (lit. 'Well, I take side North and you take side South' = 'I paint the side to the North and you paint the side to the South'). These latter examples clearly show that in very special contexts, elements like *côté* can occur independently. Here, as in Gungbe, we argue that such sequences involve a null P_1 or governor of some kind that licenses the DP containing the Ground and its Part.

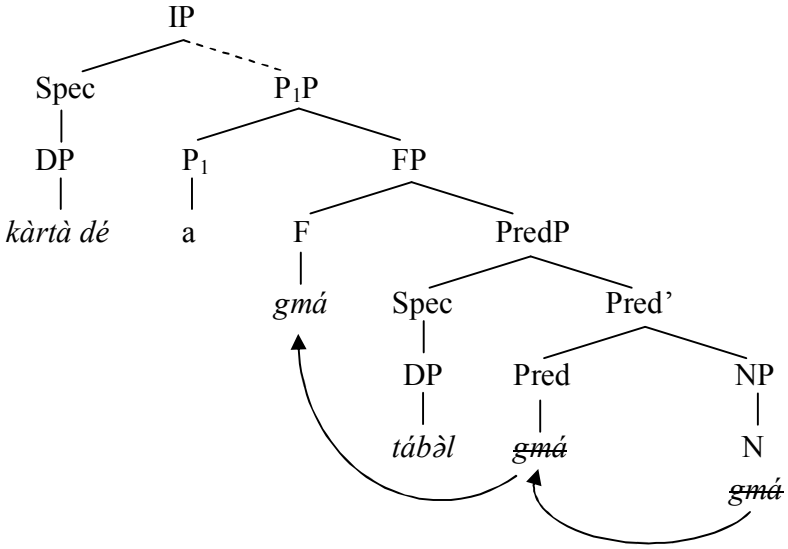
incorporates into Predº and surfaces as P_2. This derivation yields the sequence $P_1 > DP > P_2$, as illustrated in (16).

(16) [Gungbe]



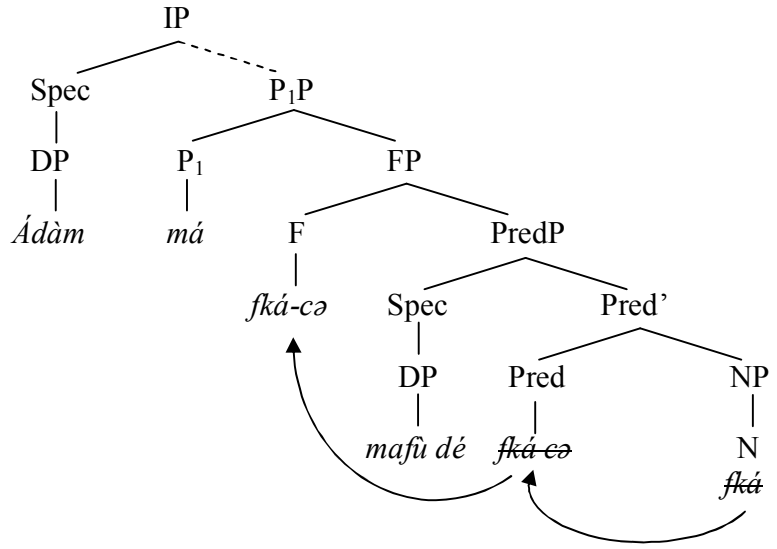
In contrast, the Zina Kotoko example (8a) involves predicate (head) inversion where P_2 moves past the reference object DP *tábəl* to a position in the vicinity of P_1 (Kayne 1994; Den Dikken 1998). This results in the pattern $P_1 > P_2 > DP$ shown in (17).

(17) [Zina Kotoko]



Similarly, the Zina Kotoko example (8b), which involves the genitive marker *cə* can be accounted for by assuming that the NP expressing Part first attaches to the genitive marker (merged under Pred) thus forming the complex form Part-Gen. The latter moves past the Ground to a higher functional head as illustrated in (18).

(18) [Zina Kotoko]



The analysis does not only account for the (near possessive) relation between the Ground and its Part (e.g., *the tree's front* in (8b)) and the various word orders found cross-linguistically, but it also sheds light on why elements of the type P_1 have morphosyntactic properties distinct from those of the type P_2.[6] We further claim that in some languages, fusion of P_1 and P_2 may yield morphologically complex adpositions like English *inside* and *in front of* or French *à côté de*. The proposed analysis extends to these cases, too (see Aboh (2010) for discussion).

3 The Expression of Spatial Relations in Sign Languages

We shall now consider how the analysis sketched in the previous section can help us in accounting for the sign language data. Intuitively, this endeavor may seem surprising given that the above structures involve two adpositions while sign languages have been claimed to make little or no use of spatial adpositions. We will argue, however, that two adpositions – one specifying path/goal and one reflecting the relevant Part (of the Ground) – are part of the underlying structure, just as in (15), and that during the derivation both fuse, thus yielding a complex spatial predicate. For the most part, the discussion will be based on examples from Sign Language of the Netherlands (*Nederlandse Gebarentaal*, NGT). We assume, however, that other sign languages express locative relations between entities in a similar way (Meier 2002; Talmy 2003). Still, we acknowledge the possibility of some cross-linguistic variation.[7] When relevant to the discussion, we present comparative data from other sign languages.

We will discuss two spatial relations, namely 'on (top of)' in section 3.1 and 'next to' in section 3.2 (see Aboh & Pfau (in preparation) for discussion of the relations 'under' and 'in(side of)'). In both these sections, we focus on the spatial predicate which we gloss as BE-LOCATED

[6] For instance, P_2 clusters with genitive markers to the exclusion of P_1.

[7] For studies on locative constructions in other sign languages, see e.g. Collins-Ahlgren (1990) on Thai Sign Language; Wallin (1990) on Swedish Sign Language; Tang (2003) on Hong Kong Sign Language; Perniss & Özyürek (2008) and Özyürek et al. (2009) on Turkish Sign Language; and Arik (2009) for a comparative study on four sign languages.

and which encodes static location. Only in section 3.3, we turn to the spatial predicate TRANSFER, which is used for the expression of transitive motion towards a location (as, for instance, in the verb PUT-DOWN).

3.1 The Spatial Predicate 'on (top of)'

3.1.1 Complexity of the Spatial Predicate

We start our discussion by looking at the spatial relation 'on (the top/surface of)'. In NGT, Figures are generally spatially localized in relation to a Ground by the predicate which, for convenience, we gloss as BE-LOCATED in the examples to follow. We will argue below, however, that this predicate is highly underspecified if not non-existent. In fact, many aspects of the surface form of this sign are contextually determined and are thus not part of its lexical entry.

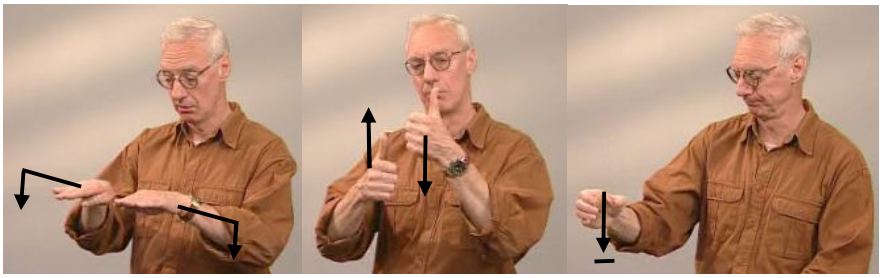
In (19a), the animate non-human Figure CAT is localized. As is evident from the accompanying video stills, the feature [location(x)] of the predicate expresses the location of the Figure CAT in relation to the Ground CHAIR. In particular, the place of articulation of the predicate coincides with the locus in signing space at which the Ground has previously been established. Also, the predicate combines with the appropriate classifier handshape for four-legged animals (i.e. V-hand with bent index and middle finger).[8] As in (1b), the locative construction is canonical in the sense that both entities precede the predicate and the Ground in turn precedes the Figure. The same pattern is observed with non-animate Figures, as is illustrated in (19b) for the Figure MILK (i.e. a glass of milk) (video stills from NGC (2002)). Note that in both cases, the locational predicate involves a short downward movement which ends in a hold.

(19) a. [NGT]

rh: $\text{CHAIR}_{\text{loc(x)}}$ CAT $\text{BE-LOCATED}_{\text{top-of-loc(x)}}$
lh: $\text{CHAIR}_{\text{loc(x)}}$ CAT
'A cat is sitting on (top of) the chair.'

[8] In the glosses, we neglect the classifier morphemes which commonly constitute a part of location predicates – implicitly adopting proposals that analyze them as (gender) agreement markers (e.g. Glück & Pfau 1998; Zwitserlood 2003).

b. [NGT]



rh: TABLE$_{loc(x)}$ MILK BE-LOCATED$_{top\text{-}of\text{-}loc(x)}$
lh: TABLE$_{loc(x)}$ MILK
'A glass of milk is on (top of) the table.'

c. ? rh: CHAIR/TABLE$_{loc(x)}$ CAT/MILK BE-LOCATED$_{top\text{-}of\text{-}loc(x)}$
lh: CHAIR/TABLE$_{loc(x)}$ CAT/MILK SURFACE$_{(x)}$
'A cat/glass is on (top of) the chair/table.'

In contrast to (1b), however, we do not observe a simultaneous classifier construction in (19ab). In principle, the Ground could be represented by a one-handed surface classifier (a flat hand) signed simultaneously with the predicate, as indicated in (19c). According to our informants, however, this strategy is marked and hardly ever observed (see next section for further discussion).[9]

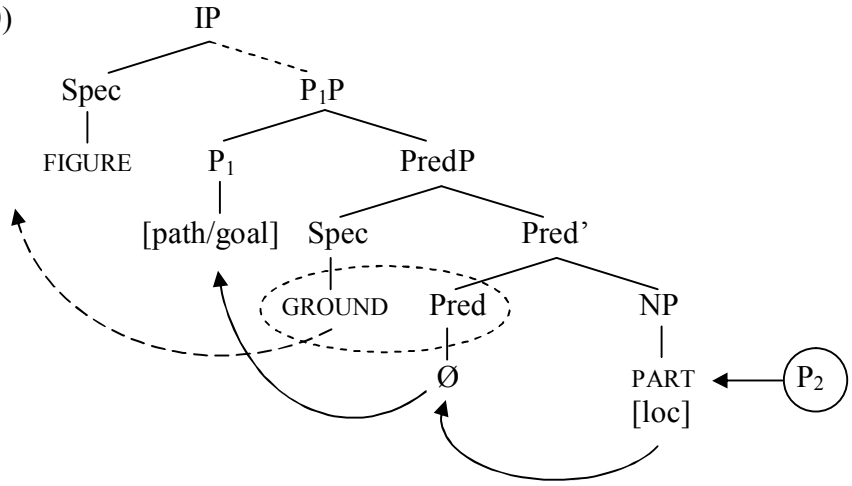
We assume that the structure proposed in (15) can also account for the sign language data. As for the realization of P_1 and P_2, we argue:

- that in (19ab), PART (P_2) is spelled out by a hold-morpheme, which indirectly represents (the surface of) the Ground-NP (cf. Rathmann (2005) and Wilbur (2008) for aspectual hold-morphemes);
- that P_1, on the other hand, is realized by a zero movement (in contrast to the spatial predicate TRANSFER to be discussed in section 3.3). Clearly, the semantics of the predicate BE-LOCATED do not imply any movement. We therefore assume that the phonological movement which is part of the predicate is a (phonetic) default movement that is inserted at spell-out. Put another way, we claim that this movement is required to articulate the hold.

The derivation of the complex predicate proceeds as follows. First, the head of the PART-NP raises to the (zero) predicate head, where spatial agreement with the GROUND is established in a Spec-head configuration (indicated by the broken circle in (20)). Subsequently, PART adjoins to P_1. The latter movement produces morphological fusion comparable to English complex prepositions (e.g. *inside*, where *side* equals the Part (P_2) and *in* equals P_1).

[9] A perseveration, as in (1b), is not observed in these examples for independent reasons. Note that both the sign CAT and the sign MILK are two-handed, that is, both hands are required to articulate the signs (see, however, the ASL example (24c) below).

(20)



The analysis sketched in (20) suggests that there is no lexical posture verb (e.g. 'lie', 'stand', etc.) in the constructions under discussion (cf. the Zina Kotoko examples in (8)). Hence, what we gloss as BE-LOCATED is just a short-hand for a fused P_1-P_2-Agreement complex. This conclusion, however, may be premature. Without going into much detail, we want to point out that it is quite possible that the verbal (posture) meaning is contributed by the orientation component of the complex sign. In (1b), for instance, the orientation of the classifier predicate (right hand in picture F) could be changed such that the palm of the hand faces upward, thus yielding the meaning 'to lie next to the tree' (see Wallin (1990) for discussion of orientation morphemes in Swedish Sign Language). In other words, it is likely that the P_1-P_2-Agr complex under P_1 moves further up to a position above P_1P, presumably V.[10] Finally, we assume that the Ground-NP moves past the Figure to a position within the left periphery of the clause.

3.1.2 The Non-dominant Hand as Part of the Ground

In the above analysis, we assumed that the final hold that is part of the movement component of BE-LOCATED represents the Part of the Ground at which the Figure is located. Evidence for the assumption that P_2 (Part) is required comes from the observation that occasionally, the Part-component is realized overtly, that is, simultaneously by the non-dominant hand (H2).

The examples in (19ab) represent prototypical situations where the Figure is located on the (upper part of) the Ground. Example (19c) indicates that – at least in NGT – in these cases, the Part of the Ground encoding location (i.e. the surface of the table) is usually left unexpressed. In less prototypical spatial configurations, however, it is more likely for H2 to serve as (Part of) the Ground, as is illustrated by the NGT example in (21a), in which the sign SURFACE (a flat hand with palm oriented downwards) is articulated simultaneously with the spatial predicate. Also, Arik (2009: 179f) observes structures of the type in (19c) in Turkish Sign Language (TİD), Croatian Sign Language (HZJ), ASL, and Austrian Sign Language (ÖGS); see the video stills in (21b) (the stimulus picture showed a mug on top of a book – a spatial configuration that could also be considered less prototypical).

[10] See Talmy (2000, ch.3) for the Figure and Ground geometries and their relations (that is, the expression of orientation) in spoken languages.

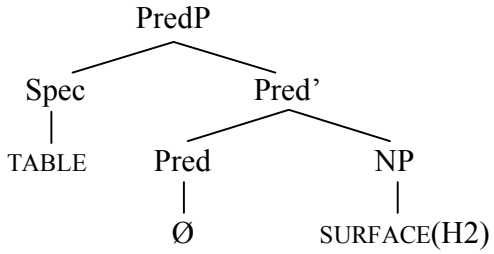
(21) a. rh: $\text{TABLE}_{\text{loc(x)}}$ BOY $\text{BE-LOCATED}_{\text{top-of-loc(x)}}$ [NGT]
lh: $\text{TABLE}_{\text{loc(x)}}$ $\text{SURFACE}_{\text{(x)}}$
'A boy is standing on a/the table.'

b.

TİD HZJ ASL ÖGS

Thus, in the examples in (21), the Part-component is realized simultaneously by the sign SURFACE articulated with H2. As shown in (22), we assume that SURFACE is merged in the same position as the hold-morpheme in (20) and subsequently raises via the predicate head to P_1. Though this awaits further confirmation, it could be argued that the hold, which represents the surface indirectly, derives from an overt nominal sign, just as P_2 in spoken languages (cf. the examples in (7) and (13); see Collins-Ahlgren (1990) for discussion of 'surface handshape morphemes' in Thai Sign Language).

(22)



We further suggest to analyze sign language structures in which the Part component is optionally expressed on a par with English sentence pairs such as the one in (23).

(23) a. The bottle is **in** the box → only P_1 realized [English]
b. The bottle is **inside** (of) the box → P_1 and P_2 realized

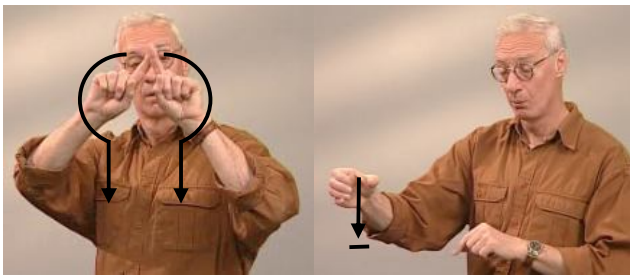
3.2 The Spatial Predicate 'next to'

Turning to the 'next to'-relation, we observe that the use of H2 as Part of the Ground is much more common in the encoding of this spatial relationship (also cf. the DGS example (1b)). Depending on characteristics of the Ground, there are two ways for H2 to participate in such structures. First, both Ground and Figure can be introduced before the locative predicate is signed simultaneously with the Part of the Ground. This is what we observe in (24a), where the spatial predicate is articulated simultaneously with the Part component SIDE (a vertical flat hand). From a structural point of view, this example is identical to (21a).

The second option for expressing the 'next to' relation, however, is more complex and requires further elaboration. Consider the NGT example in (24b). In this example, the Ground TREE is localized by a classifier predicate before the signer signs the figure BIKE followed by the spatial predicate. Crucially, the latter is articulated simultaneously with the classifier handshape which localized the tree. Note that in this case, the spatial predicate is signed by H2 (a 'dominance reversal'). What distinguishes this example from (24a) is the fact that this classifier handshape is usually taken to represent the whole entity (Supalla 1986; Zwitserlood 2003). Still, we assume that in this case, the classifier functions as Part of the Ground, just like SURFACE in (21a) and SIDE in (24a); that is, despite the fact that we gloss the second occurrence of the classifier in (24b) as CL:TREE, we assume that the relevant part of the classifier handshape are its fingertips, which represent the relevant Part (i.e. the side) of the tree.

(24) a. rh: $\text{HOUSE}_{\text{loc(x)}}$ CAR $\text{BE-LOCATED}_{\text{next-to(x)}}$ [NGT]
lh: $\text{HOUSE}_{\text{loc(x)}}$ CAR $\text{SIDE}_{\text{(x)}}$
'The car is (located) next to the house.'

b. [NGT]



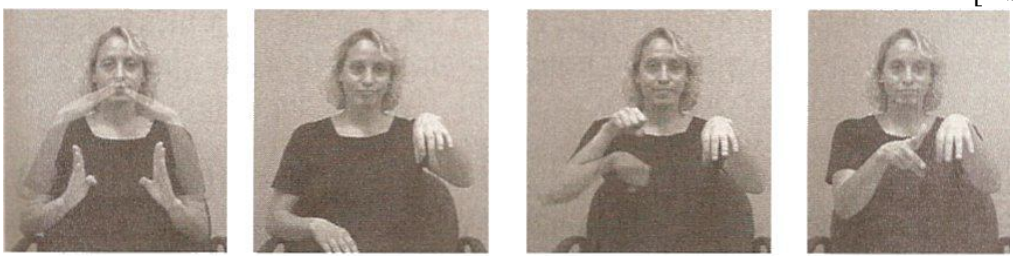
rh: TREE $\text{BE-LOCATED}_{\text{loc(x)}}$
lh: TREE----------

rh: INDEX_1 BIKE $\text{CL:TREE}_{\text{loc(x)}}$
lh: -------- BIKE $\text{BE-LOCATED}_{\text{next-to-loc(x)}}$
'My bike is (located) next to a tree.'
(lit. 'There's a tree, my bike is located next to it.')

The ASL example in (24c) is somewhat similar to (24b) but more complex as it involves a perseveration. In (24c), the Ground HOUSE is localized by a classifier predicate on H2, which is held stationary while the signer articulates the Figure BIKE and the spatial predicate (Emmorey 2002: 87). Note that in order for this perseveration to be possible, the sign BIKE, which is usually a two-handed sign, is articulated with only the dominant hand (an instance of 'weak drop'; Padden & Perlmutter (1987)). If one assumes – as we did for (24b) – that in the final picture only part of the classifier is relevant for the spatial relation (i.e. the radial side of the hand

representing the side of the house), then we are confronted with a situation in which the focus shifts from the whole entity to part of the entity while the hand is held stationary in space.

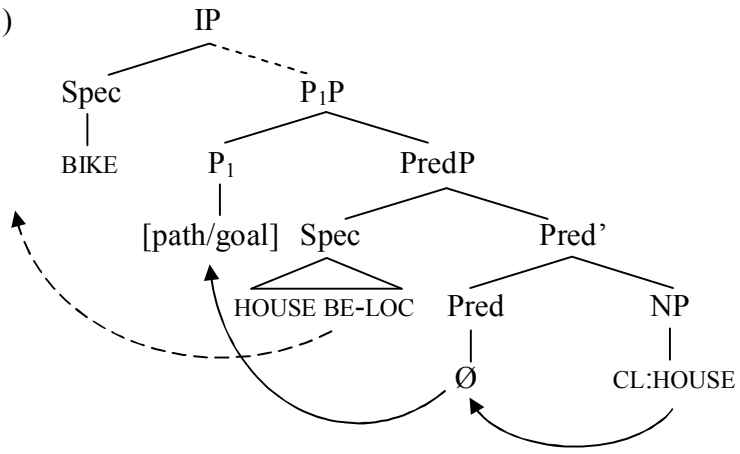
(24) c. [ASL]



rh: HOUSE BIKE BE-LOCATED$_{next\text{-}to(x)}$
lh: HOUSE BE-LOCATED$_{loc(x)}$----------
'The bike is (located) next to the house.'

We want to propose, however, that what looks like a perseveration at the surface underlyingly actually involves two separate signs. The whole entity classifier which localizes the house is part of the Ground DP in PredP (just like pointing signs that are used to localize referents in signing space are usually taken to be DP-internal). At the same time, a phonologically similar if not identical sign is employed to represent the Part of the Ground; this sign is glossed as CL:HOUSE in (25). At the surface level, the two instances are combined into one by means of a perseveration, which, in this particular context, functions as a sort of harmonizing process.[11]

(25)



[11] Conlin et al. (2003: 14) describe this type of perseveration as "maintenance of a handshape that will be used again" and point out that it is a fairly general phenomenon in ASL. Besides classifiers they also observe perseveration with wh-signs and an indefinite particle. In (i), a construction involving two instances of the two-handed wh-sign glossed as "WHAT", the non-dominant hand retains the handshape of "WHAT" between the two occurrences of the sign (Conlin et al. 2003: 15; slightly adapted). Note that the line above the gloss indicates the scope of the non-manual marker accompanying wh-questions (furrowed brows and squinted eyes).

(i) whq
rh: "WHAT" JOHN BUY YESTERDAY "WHAT"
lh: "WHAT"----------"WHAT"
'What did John buy yesterday?'

3.3 The Spatial Predicate TRANSFER

So far, we have only been concerned with the spatial predicate, which, for convenience, we glossed as BE-LOCATED – despite the fact that this sign consists of at least five morphemes: V (orientation), P_1 (movement), P_2 (hold or H2), spatial agreement (location), and classifier agreement (handshape). BE-LOCATED expresses intransitive static location. We shall now briefly address another spatial predicate, which expresses transitive motion towards a location, viz. the predicate TRANSFER.

Consider the NGT examples in (26). (26a) is the counterpart of (19a). What the predicates in the two examples have in common is (i) that the location feature of the spatial predicate coincides with that of the Ground, and (ii) that the movement ends in a hold which, as before, reflects the Part of the Ground (P_2). Note that, just as in (19c), it would be highly marked to use H2 to represent the Ground. However, (26a) also differs from (19a) in two important respects. First, the movement is longer and tends to have an arc-shaped trajectory. This movement spells out P_1, but in contrast to the examples in (19ab), it is not a semantically empty default movement which is inserted for phonetic reasons. Rather, the movement component carries meaning and therefore constitutes a morpheme that is present during the derivation.[12] Secondly, the handshape is different from that in (19a) because transfer predicates combine with Handle classifiers, not with Entity classifiers – the generalization being that the latter combine with unaccusative predicates while the former appear on transitive predicates (see Benedicto & Brentari (2004) for a discussion of the interplay of classifiers and argument structure). The derivation, however, proceeds just as in (20): P_2 moves to Pred°, where spatial agreement with the Ground is established, and then further to P_1.

(26) a. [NGT]

rh: $\text{CHAIR}_{\text{loc(x)}}$ INDEX_1 CAT $\text{TRANSFER}_{\text{top-of-loc(x)}}$
lh: $\text{CHAIR}_{\text{loc(x)}}$ CAT
'I put the cat on the chair.'

b. rh: $\text{TABLE}_{\text{loc(x)}}$ BOOK $\text{BE-LOCATED}_{\text{top-of-loc(x)}}$
lh: $\text{TABLE}_{\text{loc(x)}}$ BOOK
rh: INDEX_1 CUP $\text{TRANSFER}_{\text{next-to-loc(x)}}$
lh: $\text{CL:BOOK}_{\text{loc(x)}}$
'A book is lying on the table. I put a cup next to it.'

[12] It is interesting to note that NGT thus spells out P_1 differently in 'be-located' and 'transfer' predicates while in e.g. English, the same element finds use in the two types of construction, as illustrated by the following sentence pair.

(i) The book is **on** the table. → be-located
(ii) I put the book **on** the table. → transfer

Example (26b) illustrates the use of the spatial predicate TRANSFER in a 'next to' context. The first part of the example does not require explanation as it is similar to (19b); in this part, BOOK functions as the Figure. In the second part, however, BOOK is the Ground in relation to which the Figure CUP is located by means of the spatial predicate. As before in (24bc), we argue that the Entity classifier CL:BOOK (a flat hand with fingertips oriented forward) is P_2 and that only part of this Entity classifier (the radial side of the hand) is relevant for the spatial relation.[13]

4 Conclusion

In this paper, we discuss spatial expressions in sign languages and spoken languages. In both types of languages, locative constructions express a relation between a Figure and a Ground. How this relation is phonologically encoded is modality-specific; the underlying syntactic structure, however, is modality-independent. For instance, we show that the Ground may be complex in that it involves a *Reference Object* whose Part is used to localize the Figure (Talmy 2000). Literally, this implies that a sentence like "The book is on the table" could be paraphrased as "The book is on the top of the table". In terms of this analysis, two elements are important: one that encodes path/goal (P_1) and one that, as Part of the Ground, specifies the exact location (P_2). These are illustrated again in (27), which provides comparable examples from Gungbe, English, and NGT, respectively.

(27) a. Dáwè lɔ́ nɔ̀ tè **tò** [$_{DP}$ kpó lɔ́] **jí** [Gungbe]
man DET remain standing P_1 mountain DET P_2
'The man is standing on top of the mountain.'

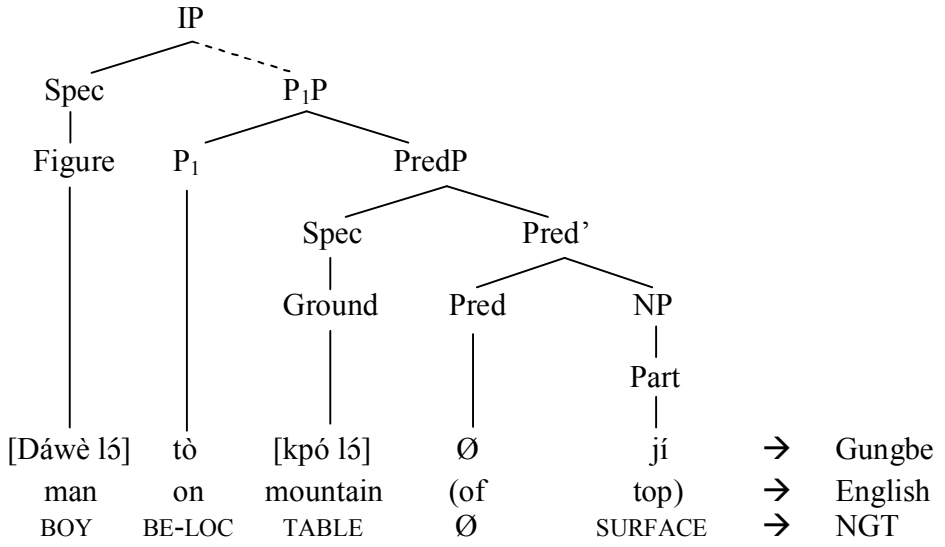
b. The man is **on** (**top** of) the mountain [English]

c. rh: $TABLE_{loc(x)}$ BOY $BE\text{-}LOCATED_{top\text{-}of\text{-}loc(x)}$ [NGT]
lh: $TABLE_{loc(x)}$ $SURFACE_{(x)}$
'A boy is standing on a/the table.'

The structure in (28) shows how the relevant elements in the three examples – the Figure, the Ground, P_1 and P_2 (Part) – are merged in the phrase structure. Remember that in NGT, P_1 will be spelled out by a default movement in this example and that P_2, which is realized by H2 in (27c), may also be realized by a hold in other contexts.

[13] We acknowledge that the structure of (26b) is probably even more complex since there appear to be two P_2-elements: the classifier representing the book and the final hold of TRANSFER. These two P_2-elements, however, reflect Parts of different Grounds, the former the side of the book and the latter the surface of the table. In other words, the example would be more appropriately translated as 'I put a cup next to it (on the table)'.

(28)



Languages differ with regard to the morphological realizations of P_1 and P_2 and how they distribute these elements: in Gungbe, the elements are independent of each other, while in NGT, they have to fuse (see also the discussion in sections 2.2 and 3). Yet, in languages where these two elements are identifiable, P_1 generally relates to predicates or relators while P_2 develops from relational nouns.

The paper therefore demonstrates that when it comes to spatial expressions, sign languages are not exceptional despite the fact that they have the potential to make use of the signing space. If our analysis is on the right track (and we believe it is), this would mean that the apparent iconic properties of locative constructions in sign languages are an artifact of the syntax of spatial expressions. Iconicity thus reduces to a spell-out phenomenon and is not part of the computational system. As such, it is comparable to surface effects in spoken languages.

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