# A linguistic analysis of the use of the two hands in sign language poetry*

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## 1. Introduction

### 1.1 Poetry in signed languages

Signed languages of Deaf communities are used for types of creative expression similar to those we find in spoken languages. In many Deaf communities we find theatre in which signed languages are used, there are sign puns and other types of plays on words, and there is also sign language poetry (Klima & Bellugi 1975, 1979, Ladd 2003, Sutton-Spence 2005).

Since sign language communities do not commonly use a writing system to represent their language on paper or in a digital form, sign poetry is always performance art. Whether on stage or recorded by camera, sign language poems will always combine the abstract sequence of signs and grammatical constructions with one particular performance of that sequence.

### 1.2 NGT poetry by Wim Emmerik

The data for the present study consist of a video tape with poems in Sign Language of the Netherlands, created and performed by Wim Emmerik. Emmerik has played a key role in the Dutch Deaf community in the past decades. He has been involved in sign language research from the early 1980s, and participated in starting a wide variety of cultural activities in which Sign Language of the Netherlands (henceforth 'NGT', Nederlandse Gebarentaal) played a central role, including story telling, theatre performances and plays. For his pioneering role in all of these activities, Dovenschap, the Dutch Deaf organisation, awarded him the first NGT prize in 2005.

The first publication of Emmerik's poems was the videotape 'Gebarentaal-poëzie' ('Sign language poetry'; Emmerik 1993). This tape contains performances of fifteen poems, each preceded by a brief signed introduction about the background of the poem. It is this set of fifteen poems that form the data for the study reported on in this paper. This collection of poems was made accessible in a digital form within the ECHO project (Crasborn et al. 2004): both an MPEG-1 movie file and an elaborate linguistic transcription within the ELAN annotation software can be freely downloaded.[1] After this first collection of poems, Emmerik recently collaborated on a DVD project presenting five sign poems, each interpreted in a different visual style by a Dutch filmmaker (Leendert Pot; Emmerik et al. 2005). In recent years, Emmerik has inspired a number of young deaf people in the Netherlands to also create sign language poems.

## 1.3   Research questions

The present study aims to establish how the use of the two hands in Emmerik's poetry differs from that in ordinary sign language use. The presence of two identical articulators is one of the features that most distinguishes the visual modality from the oral-aural modality used in spoken languages; the modality difference itself is generally considered to form the core difference between spoken languages and signed languages used by Deaf people (e.g. Klima & Bellugi 1979, Sandler & Lillo-Martin 2006).

One can imagine many different ways in which the two hands might be used to create poetic effects. For example, they might be used to create symmetrical signs or constructions, the two hands being mirror images of each other; by contrast, they could also be used to add multiple simultaneous layers of meaning by each articulating different information. This study has the aim of making a start in the analysis of NGT poetry by answering the following questions.

1.   Is the use of the two hands more frequent or more prominent in poetry than in other registers?
2.   Is there substantial variation in the use of one vs. two hands between poems, or is the extent to which the two hands are used a general feature of Emmerik's poetic register?
3.   Do we find one-handed signs being realised with two hands to create a salient symmetrical effect?
4.   Are the two hands used for uttering two different signs simultaneously?

The background against which the relevance of these questions can be interpreted is provided in Section 2, where the use of the two hands in regular (non-poetic) registers is discussed, including the linguistic restrictions that have

been established for both lexical items and morphosyntactic and discourse constructions. Section 3 presents an analysis of the poems in order to answer each of the four questions above. Finally, Section 4 sums up the findings and makes explicit how the analysis of sign poetry can contribute to our general understanding of sign languages.

## 2.    Two-handed signs in regular language use

### 2.1  Introduction

The use of both hands is a common feature of all sign languages studied to date, including NGT; we know of no sign language that only uses one hand for its articulation. Not only does the lexicon of NGT contain both one-handed and two-handed signs, but there is also a large variety of morphosyntactic and discourse processes that involve the use of two hands. These two categories are described in further detail in the rest of this section.

### 2.2  Phonological restrictions on lexical signs

Since it is not predictable whether a lexical item will be articulated with one or two hands, this is something that is included in the lexical specification of signs. Two types of two-handed lexical signs are distinguished in phonological analyses of signs (e.g. Brentari & Goldsmith 1993, Sandler 1993, van der Hulst 1996, Napoli & Wu 2003): signs in which both hands act as active articulators, and signs in which one hand forms the location for the other hand (the active articulator).

In analysing the lexical patterns in the set of two-handed signs in American Sign Language (ASL), Battison (1978) formulated two generalisations, known as the Symmetry Condition and the Dominance Condition. These generalisations have later been found to hold for many other sign languages, including NGT (e.g. Crasborn 1995). The Symmetry Condition states that if both hands move, the handshape and orientation of the two hands are identical or symmetrical, and the movement is either in synchrony or alternating. The Dominance Condition states that if the handshapes of the two hands are not identical, one hand must be inactive and act as the location for the other hand, and this passive articulator has a handshape from a restricted set.

Although these generalisations express a fairly clear picture of the range of two-handed phonological structures, it is not always self-evident that a sign is either one-handed or two-handed in its lexical representation. Both

symmetrical and asymmetrical two-handed signs can be articulated with one hand (Battison 1978), a process that is called 'weak drop' (Padden & Perlmutter 1987, van der Kooij 2001). Conversely, one-handed signs are sometimes articulated with two hands, creating a symmetrical two-handed version of the sign (sometimes labeled 'weak prop' (Padden & Perlmutter 1987) or 'doubling'). While weak drop is a common phenomenon in regular conversational signing, the frequency of doubling, while not systematically investigated in a large corpus, appears to be very low.

## 2.3   The use of the two hands beyond the lexicon

Utterances in which the two hands are involved can also be found beyond the lexicon, both in the form of complex morphosyntactic constructions and in the form of discourse constructions.

Both the left and the right hand can take on the role of a 'classifier': the handshape and orientation of the hand are used to represent a referent, and the movement and location of the hand are used to represent its location and movement. The resulting forms typically are the main predicate in the clause. Different handshapes and orientations are used for different groups of referents, thus 'classifying' them. While both these groups and the forms to represent them vary across languages, most if not all sign languages seem to make use of such classifier constructions (see the papers in Emmorey 2003, and Zwitserlood 2004 for NGT). Classifier constructions can be either one-handed or two-handed. In the latter case, each hand represents a different entity, and either one or both hands move, depending on the meaning that is encoded in the location, spatial arrangement and movement aspects of the construction. Phonetic restrictions on bimanual coordination partly restrict the extent to which movement of both hands can differ; moreover, in the prototypical case, two-handed classifier constructions in which both hands move represent the movement of two entities with respect to each other, in terms of approaching or parallel movement.

There is an ongoing debate on the linguistic status of these classifier constructions, some researchers arguing that the location and movement components should be considered a sign language form of 'gesture' (e.g., Liddell 2003). At the same time, however, many productive classifier constructions pattern with the phonological regularities found for lexical signs. For many lexical items, such as HOUSE, LONELY and BANANA, one can argue that they probably have originated as classifier constructions of different types, and over time have acquired a fixed form-meaning pairing and can now be said to form part of the NGT lexicon.

In additions to these two-handed forms that have a 'morphosyntactic' origin, where the two hands together form one complex morphological form, we find a frequent occurrence of simultaneous constructions involving the two hands in signed language discourse (see Vermeerbergen, Leeson & Crasborn, to appear, for a review of the literature). If the two hands are present and the sign does not form a two-handed lexical item or a classifier construction, we can distinguish at least three different types of phenomena.

First, the non-dominant hand can 'spread' (remain present) while the dominant hand continues to sign the next sign; this type of low-level ('phonetic') spreading occurs quite frequently, and typically lasts only during one or two subsequent signs. Secondly, one hand of a sign or classifier construction can be held in space for a longer time while the other hand continues signing, playing a role in the semantic interpretation of the sentence or in the organisation of the discourse structure; Liddell (2003) discusses such constructions in detail, labelling them as 'buoys' and distinguishing various subtypes.

In both of the above constructions, one hand is active while the other hand remains immobile. In a third group of cases, both hands move, but the two hands do not both constitute a classifier; thus, two separate signs (one of which can be a classifier) are articulated simultaneously. While examples of this category have only been informally observed in NGT, the phenomenon does seem to occur in this language as well. One of the two signs appears to be a pointing sign in most if not all of these constructions (cf. Miller 1990 for LSQ, Engberg-Pedersen 1993 for Danish Sign Language).

## 2.4  Dominance reversal

By default, right-handed signers use their right hand as the more active or 'dominant' hand; left-handed signers use their left hand. The dominant hand is the hand used to articulate one-handed signs, and it is the moving hand in signs or constructions in which only one hand moves. In sign language discourse, however, it is not uncommon for the two hands to switch roles from time to time; this is called 'dominance reversal' (Frishberg 1985, Miller 2000). Signers thus are fairly flexible in their selection of which hand to use as the dominant hand, but the reason to switch dominance is generally a linguistic one (see references above for further discussion).

## 2.5  Summary

In summary, in regular interaction in (most) signed language(s), including NGT, the use of both manual articulators is very common, and has its source

in many different layers of the grammar. There are two-handed lexical items, the two hands can be involved in morphosyntactic constructions where each hand is a classifier, and the two hands can collaborate in discourse constructions where one hand stays in place while the other continues signing. Finally, there are grammatical and discourse contexts that lead to a change in the roles of the two hands. While not each of these processes and patterns has been studied in detail for NGT, they seem to be characteristic for many western sign languages, and the NGT data analysed and observed thus far support the distinctions made above. In the next section, these patterns of a standard conversational register are compared with a poetic register in NGT.

## 3.    The two hands in sign language poetry

### 3.1  Frequency

As a general impression of Emmerik's poems, one is struck by the fact that the two hands appear to be present almost all of the time, or that they are used more extensively than in ordinary conversations. The first research question was therefore how frequent the use of the two hands in poetry is in comparison to other registers.

There is no common measure for quantifying how frequent the use of the two hands is. Since some signs last longer than others, and one of the two hands can spread, the duration in seconds would not appear to be a very informative measure. Therefore, the total number of signs for each hand was considered. A 'sign' was considered to be an action of the hand that was assigned a gloss or a similar type of label in the ECHO transcriptions of the poems (see Nonhebel et al. 2004 for the transcription conventions that were used).

The total duration of the video tape is 29 minutes; the total duration of the fifteen poems, disregarding the titles and introductions to the poems, was 18 minutes. In these 18 minutes, the right hand articulated 473 units and the left hand articulated 403 units (see Table 1). While this distribution of the roles of the left vs. right hand was expected given that Emmerik is a right-handed signer, the activity of the left hand seems fairly high.

To corroborate this intuitive evaluation, the same count was performed for non-poetic data (also included in Table 1). Unfortunately, not all of the introductory stories preceding the poems were glossed, making it difficult to compare Emmerik's own non-poetic signing. However, the same online corpus in which the poetry data were published also contained story-telling. The same person annotated these stories following the same transcription conventions.

Two signers performed the same five fable stories, taking a total of nearly 16 minutes for the ten stories. Their left hands realised 487 items, while their right hand produced 1161 items. While there was a small difference between the two signers and some variation between their five stories, the ratio was roughly as indicated by the totals: the right hand produces over twice as many signs and sign-like constructions as the left hand.

These fable stories cannot be considered to be a standard conversational register, but also constitute a form of creative signing. One might therefore have expected to find a pattern that is fairly close to that found in poetry, with a prominent role for both hands. Instead, the restricted use of the two hands in the story-telling data confirm the intuitive impression that the two hands are extremely active in Emmerik's poetry. The prediction that the two hands are used even less in standard conversational signing remains to be tested in future studies.

**Table 1.**  Activity of the left and right hand in different registers and signers

| Data set | Total duration (mm:ss) | Tokens signed by left hand | Tokens signed by right hand | Total |
| --- | --- | --- | --- | --- |
| Poems WE | 18:00 | 403 (46%) | 473 (54%) | 876 (100%) |
| Fables signer AH | 09:18 | 244 (29%) | 611 (71%) | 855 (100%) |
| Fables signer JR | 06:44 | 243 (31%) | 550 (69%) | 793 (100%) |

The second research question was whether there is a lot of variation between poems in the extent to which the two hands are used. A closer inspection of the data revealed that there were only 37 instances in the poems where only one hand is present; these accounted for less than 5% of the total duration of the poems (49.5 seconds of 18 minutes). These 37 cases where only one articulator (typically but not always the right hand) was used appeared to be distributed more or less evenly over the 15 poems. Only three poems did not feature any one-handed sign; two of these are very short, and will be discussed in more detail in Section 3.3 below. In addition, one short poem ('Process', 26.5 seconds) contained only one two-handed construction, and contrasts two concepts by first signing a few phrases with the right hand and then taking over with the left hand.

In conclusion, one can say that there does appear to be some variation between poems, but overall, it appears to be part of (Emmerik's) poetic style to use the two hands as much as possible. It was shown that the extent to which the two hands are used is much lower in another creative signing style, namely story-telling. The next two sections explore how exactly the two hands come to be so intensively used in a poetic register.

### 3.2   Doubling of one-handed signs

There are several ways in which a signer can keep both hands active in creating a poem. Perhaps the most obvious way is by only selecting signs that are lexically specified for being two-handed. One alternative might be to produce lexically one-handed signs with two hands, making them symmetrical. Both Russo et al. (2001) and Sutton-Spence (2005) point to the prominent role of symmetry in sign poetry in Italian and British Sign Language, respectively. The third research question of this study was whether indeed we find one-handed signs being realised with two hands, creating a symmetrical two-handed form. As was already noted in Section 2.2, it is not always easy to determine whether a sign is one-handed or two-handed; in some cases, only data from large corpora will be able to provide conclusive evidence. In other cases, it is hard to establish whether a two-handed sign is really a lexically stored form or rather a productive classifier construction (cf. the discussion in Section 2.3 above).

Although no effort was undertaken to quantify the occurrence of two-handed articulations of one-handed signs, it is not hard to find instances of one-handed signs produced with two hands. In these cases, the two hands both act as active articulators. Examples from the poem 'Solid foundation' are BRIDGE and TREE. In both cases, the articulation with two hands has a semantic impact, referring to more than one object, but the signs differ from classifier constructions in that the latter are not commonly used in a localising manner, simultaneously introducing two similar objects at two locations. This process of symmetrical 'doubling' is also found without a clear semantic impact, as in BE-PRESENT, where the implication is not that there are two objects present.

Given that it is possible to realise a one-handed sign with two hands for aesthetic purposes and that the participation of the two hands is so prominent, it is perhaps a more interesting question why not *all* one-handed signs are made with two hands. An inspection of the 37 cases where only a one-handed sign is articulated in otherwise two-handed poems reveals several possible reasons why a two-handed articulation of the one-handed sign is not created.

First of all, it is sometimes phonetically impossible to create a two-handed version of a one-handed lexical item because of an articulatory reason. Specifically, if the location of the sign is on the midline of the body or crosses the midline with its movement, a two-handed sign would not be able to optimally articulate the phonologically specified location. There are altogether 13 cases (out of 37) where this factor seems to play a role in determining the choice for a one-handed sign. Two examples are YUGOSLAVIA and APPLE, illustrated in (1).

(1)    YUGOSLAVIA and APPLE



In YUGOSLAVIA, the movement goes from one side of the upper body to the other; trying to articulate a symmetrical two-handed version would lead to the hands bumping in to each other, or require extra coordination effort in order for one hand to move in front of the other, with only one hand touching the body at the same time (which is not a common sign movement). In APPLE, only one hand at a time can be right in front of the mouth, which is the place of articulation of the sign. A second reason appears to be a semantic one, related to the iconicity of many signs: even if it were phonetically possible to create a two-handed version, it would lead to an interpretation of the sign that is awkward or not appropriate; this happens in 17 cases. For example, if signs like ERECTION and SUN-SHINING would be made with two hands, the (iconic or grammatical) interpretation would be that there are two penises or two suns.[2] A third reason for not having two-handed versions is that the two-handed version of the sign is a different lexical item. One of the few minimal pairs distinguished only by the number of hands occurs in one of the poems, namely AT-HOME, illustrated in (2). The two-handed symmetrical version would be the lexical item TRUST.

(2)    AT-HOME and HUMAN-BEING



For one other sign, HUMAN-BEING, which is also illustrated in (2), it is not quite clear if its two-handed counterpart, being BEHAVIOUR, really forms a 'phonetic minimal pair' for this signer (its location seems to be higher on the chest).[3] Together, these lexical reasons for not creating a two-handed version make up for 6 cases.

The above factors sometimes overlap; in 4 cases, no clear reason to only use one hand was apparent. Of course, each of the factors discussed above need not be the actual reason why the poet chose to use the forms found in the video; they are simply plausible factors that can play a role. The extensive use of the two hands demonstrated in Section 2 of this paper and the clear contrast with one poem where only one-handed sign forms are used does compel us to search for an explanation of the few irregular patterns elsewhere.

### 3.3  Saying two things at the same time

The final question was whether the two hands are used for uttering two different signs simultaneously. This is perhaps the most imaginative construction from the point of view of the modality difference: speaking with two tongues is indeed possible in signed languages. Does it also happen in Emmerik's poetry?

Possibly due to the complex motor control required to actually produce two different movements with (potentially) different articulatory configurations, there were few instances of 'full simultaneity', where two different lexical items start and end at the same time. What occurs very frequently though is spreading of the weak hand: one hand of a two-handed sign stays in its end position while the other hand continues to form a new sign; here too, a semantic contrast can be expressed by the two hands, even though their movement is not in synchrony. There are two short poems that illustrate the two processes, full simultaneity and spreading of the non-dominant hand: 'Hope' and 'Falling leaf'. They are presented in transcription in (2) and (3), respectively; the former is also illustrated by three screen shots of the middle of each of the three stages. In both poems, the upper line refers to the right hand and the bottom line refers to the left hand. The horizontal lines following a gloss in (2) indicate that the activity of the two hands is synchronised in time; in (3), the line indicates how long the right hand is held in its final location.

(2)  PISTOL-AT-HEAD   PISTOL-SHOOT   FALL-DOWN
      HOPE_____   DO_____   LIFE_____
      Right hand: 'Someone is shot in the head, and falls down dead.'
      Left hand: 'As long as there's hope, we live.'

(3)    TREE                                                                    PURPLE
       TREE  CLOUD  LEAF-ON-TREE  LEAF-CRUBLES  LEAF-FALLS  PURPLE

The poem 'Hope' is a response to recent medical developments (cochlear implants) that aim at 'curing' deafness. Many deaf people are skeptical about this because they do not feel they actually need to be cured (Blume 2006). The poem expresses that for hearing parents of young deaf children who almost all undergo this operation these days, this operation is something that brings hope — even though to the poet it amounts to shooting someone. The signs of the left hand are a literal sign translation of the Dutch expression 'hoop doet leven' ('as long as there's hope, we live'). The two views on cochlear implants are contrasted sharply through simultaneously articulating them with the two hands, the movements of the left and right hand starting and ending exactly at the same time. As was indicated in Section 2, this combination of different signs on the two hands occurs very rarely in normal discourse, and to my knowledge has never been observed to characterise a sequence of signs.

The poem 'Falling leaf' is a successful attempt to use the traditional haiku form in sign: the result is a short poem about nature with three clearly distinguishable segments. Here, we see the phenomena of spreading and dominance reversal optimally exploited: in the two-handed sign TREE, the right hand is the active one, which then stays in its final position while the left hand articulates a whole series of signs; at the end of the poem, the two-handed sign PURPLE is articulated with the right hand as the dominant hand again. One might argue that the left and right hand contrast the immobile, static, parts of life (the tree on the right hand) with the ever-changing lighter elements of life (clouds and trees, on the left hand). Whatever the actual literary interpretation of the poem may be, from a linguistic point of view it is interesting that dominance reversals which are found frequently in regular discourse registers for all kinds of purposes can also be stylised and used for poetic purposes: apparently, they form an aspect of signing that signers are aware of.

## 4.  Conclusion

In conclusion, a clear picture of the use of the two hands in NGT poetry has emerged in this study. Both the high frequency of the use of the two hands and the different types of uses that were discussed compare well with findings for BSL poetry by Sutton-Spence (2005). The study of creative signing registers can help us further broaden our view of sign language, much in the line of Liddell's (2003) analysis of ASL discourse as a close integration of linguistic and gestural

elements. Liddell analysed many non-lexical two-handed constructions (involving 'buoys') as gestural because they do not make use of linguistically predefined locations in space. The fact that similar constructions also occur in creative language use as seen in sign language poetry further emphasises the close integration of language and gesture in human communication.

## Notes

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**1.** The ECHO corpus of sign language data, including all data used in this study, is available at http://www.let.ru.nl/sign-lang/echo/; this corpus also includes samples of poetry in British Sign Language (BSL). The ELAN annotation software is freely available for research purposes at http://www.mpi.nl/tools/elan.html.

**2.** This role for semantic and iconic factors parallels the findings in van der Kooij (2001) on the possibility of weak drop in different signs.

**3.** The forms would constitute a true minimal pair in the sense that there is only one phonological location 'upper body', without further distinctions in height. At a phonetic level however, and for the viewer of these poems, the forms would look like minimal pairs. For further discussion of minimal pairs in NGT, see van der Kooij (2002).

## References

Battison, Robbin. 1978. *Lexical borrowing in American Sign Language*. Silver Spring, MD: Linstok Press.

Blume, Stuart. 2006. *Grenzen aan genezen. Over wetenschap, technologie en de doofheid van een kind*. Amsterdam: Prometheus.

Brentari, Diane. 1998. *A prosodic model of sign language phonology*. Cambridge, MA: MIT Press.

Brentari, Diane & John Goldsmith. 1993. "Secondary licensing and the nondominant hand in ASL phonology". *Phonetics and phonology, vol. 3: Current issues in ASL phonology* ed. by Geoffrey Coulter, 19–41. San Diego, CA: Academic Press.

Crasborn, Onno. 1995. Articulatory symmetry in two-handed signs. MA thesis, University of Nijmegen.

Crasborn, Onno, Els van der Kooij, Annika Nonhebel & Wim Emmerik. 2004. ECHO data set for Sign Language of the Netherlands (NGT). Department of Linguistics, Radboud University Nijmegen. URL: http://www.let.ru.nl/sign-lang/echo.

Emmerik, Wim. 1993. *Gebarentaalpoëzie*. VHS video tape. Amsterdam: Uitgeverij Het Complex.

Emmerik, Wim, Giselle Meyer, Anja Hiddinga & Leendert Pot. 2005. *Bewogen*. DVD. Amsterdam: Stichting Geelprodukt.

Emmorey, Karen, ed. 2003. *Perspectives on classifier constructions in sign languages*. Mahwah, NJ: Lawrence Erlbaum Associates.

Engberg-Pedersen, Elisabeth. 1993. *Space in Danish Sign Language. The semantics and morphosyntax of the use of space in a visual language*. Hamburg: Signum.

Frishberg, Nancy. 1985. "Dominance relations and discourse structures". *SLR '83. Proceedings of the 3rd international symposium on sign language research*, ed. by William C. Stokoe & Virginia Volterra, 79–90. Rome: CNR.

Hulst, Harry G. van der. 1996. "On the other hand". *Lingua* 98.121–143.

Klima, Edward S. & Ursula Bellugi. 1975. "Wit and poetry in American Sign Language". *Sign Language Studies* 8.203–224.

Klima, Edward S. & Ursula Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.

Kooij, Els van der. 2001. "Weak drop in Sign Language of the Netherlands". *Signed languages. Discoveries from international research* ed. by Valerie L. Dively, Melanie Metzger, Sarah F. Taub & Anne Marie Baer, 27–42. Washington DC: Gallaudet University Press.

Kooij, Els van der. 2002. *Phonological categories in Sign Language of the Netherlands. The role of phonetic implementation and iconicity*. PhD diss., Leiden University (published by LOT: Utrecht).

Ladd, Paddy. 2003. *Understanding deaf culture. In search of deafhood*. Clevedon: Multilingual Matters.

Liddell, Scott. 2003. *Grammar, gesture and meaning in American Sign Language.* Cambridge: Cambridge University Press.

Miller, Chris. 2000. Iconic and metaphorical mappings in multichannel syntax and discourse: simultaneity and handedness alternations in LSQ (Quebec Sign Language). Manuscript, University of Quebec, Montreal.

Napoli, Donna Jo & Jeff Wu. 2003. "Morpheme structure constraints on two-handed signs in American Sign Language: notions of symmetry". *Sign Language & Linguistics* 6.123–205.

Nonhebel, Annika, Onno Crasborn & Els van der Kooij. 2004. Sign language transcription conventions for the ECHO project. Version 9, 20 January 2004. Manuscript, Radboud University Nijmegen. URL: http://www.let.ru.nl/sign-lang/echo/docs/ECHO_transcr_conv.pdf

Padden, Carol & David Perlmutter. 1987. "American Sign Language and the architecture of phonological theory". *Natural Language & Linguistic Theory* 5.335–375.

Russo, Tomassso, Rosaria Giuranna & Elena Pizzuto. 2001. "Italian Sign Language (LIS) poetry: iconic properties and structural regularities". *Sign Language Studies* 2.24–61.

Sandler, Wendy. 1993. "Hand in hand: the roles of the nondominant hand in sign language phonology". *The Linguistic Review* 10.337–390.

Sandler, Wendy & Diane Lillo-Martin. 2006. *Sign language and linguistic universals.* Cambridge: Cambridge University Press.

Sutton-Spence, Rachel. 2005. *Analysing sign language poetry*. Basingstoke, Hampshire: Palgrave Macmillan.

Vermeerbergen, Myriam, Lorraine Leeson & Onno Crasborn. To appear. "Simultaneous structures in signed languages: an introduction". In *Simultaneity in signed languages: form and function,* ed. by Myriam Vermeerbergen, Lorraine Leeson & Onno Crasborn. Amsterdam: John Benjamins.

Zwitserlood, Inge. 2004. *Classifying hand configurations in Nederlandse Gebarentaal*. PhD diss., Utrecht University (published by LOT: Utrecht).