

Transparency in Sign Language of the Netherlands: A Functional Discourse Grammar analysis*

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The degree of transparency, i.e. the extent to which one-to-one relationships between meaning and form exist, varies across languages. Within the framework of Functional Discourse Grammar (FDG), various spoken languages have already been investigated. However, transparency in signed languages is an unexplored field. This study aims to start research in this area by studying one specific sign language, namely Sign Language of the Netherlands (NGT). The purpose of this investigation is to establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages, and subsequently, to tentatively answer the question whether transparency patterns are modality-specific. By means of consulting existing research on NGT and by analysing the Corpus NGT, I examine 13 transparency features operating between and within the different levels of FDG. By comparing the results to 30 spoken languages, it turns out that NGT is located in the middle of the transparency hierarchy, i.e. NGT behaves on average regarding the degree of transparency. Moreover, NGT follows the likelihood of transparent manifestations determined for spoken languages perfectly. Therefore, the tentative answer, purely based on the results for this particular sign language, is that transparency patterns are not modality-specific.

1 Introduction

If one thinks about language in terms of communication and learnability, one would expect that all languages would be fully transparent. However, most languages of the world are not. The degree of transparency, that is, the extent to which one-to-one relationships between meaning and form exist, varies across languages. Several spoken languages have already been investigated within the framework of Functional Discourse Grammar (FDG), which proposes four levels of analysis: Interpersonal, Representational, Morphosyntactic, and Phonological (Hengeveld & Mackenzie 2008; Keizer 2015). Within and across

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these levels, various features might be expressed transparently or non-transparently.

However, spoken languages are not the only natural languages of the world and, from a typological perspective, it is truly interesting to investigate transparency in signed languages as well. Although signed languages are similar to spoken languages with respect to many core properties, they function in a different modality of production and perception. Signed languages exist in the visual-spatial modality rather than the auditory-oral modality. This is one of the reasons why signed languages are frequently assumed to be more transparent than spoken languages. Another cause might be that they are relatively young in comparison to spoken languages.

An elaborate study of transparency in signed languages has not been conducted yet, and therefore this article aims to start research in this area by studying one specific sign language, namely Sign Language of the Netherlands (*Nederlandse Gebarentaal*, NGT). The aim of this study is, firstly, to establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages. Secondly, this study aims to determine whether there are modality-specific features by comparing the results for NGT with the results that have been obtained in earlier research for 30 spoken languages (e.g. French, Fongbe, Turkish, Hupa, Basque, Japanese) (Hengeveld & Leufkens 2018).

In Section 2, transparency within the framework of FDG will be discussed in more detail. Section 3 provides an introduction to the language under investigation. In Section 4, the research questions will be clarified. In this section, I also describe the method of investigation. The investigated features will be explained in Section 5 in which I also present the results for NGT. Section 6 concerns the transparency hierarchy that has been postulated for spoken languages and the place of NGT on this hierarchy. Discussion points will be considered in Section 7, and in Section 8, I summarise the findings concerning the degree of transparency in NGT, whether the place of NGT on the transparency hierarchy that has been postulated for spoken languages can be determined, and whether modality-specific patterns can be established.

2 Transparency in Functional Discourse Grammar

Before we can identify the degree of transparency in NGT properly, we need to define the concepts of transparency and FDG. In this section, I will describe the framework of FDG and the implementation of transparency within this model.

FDG is a structural-functional theory that is organised top-down, which means that it starts with the intention of the speaker and then works down to the articulation of a linguistic unit. FDG contains four levels of analysis, which interact with each other: the Interpersonal (pragmatics), Representational

(semantics), Morphosyntactic, and Phonological Levels. The Interpersonal and Representational Levels are concerned with various aspects of meaning, whereas the Morphosyntactic and Phonological Levels are dealing with different aspects of form. A schematic representation of the framework of FDG is presented in Figure 1 below. As the arrows indicate, there is a top-down interaction between all four levels.

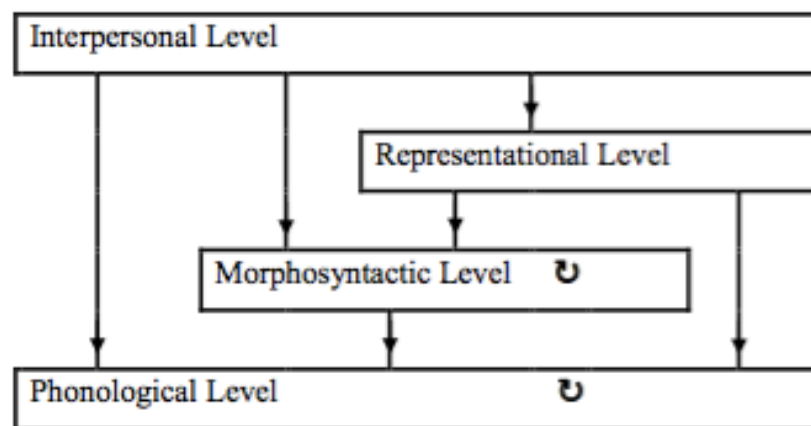


Figure 1: Framework FDG: interactions between and within grammatical levels (Hengeveld & Leufkens 2018: 142)

Transparency is generally defined as a one-to-one mapping between form and meaning. However, within the framework of FDG, it can be defined more precisely as a one-to-one mapping across all four levels. For instance, a single pragmatic unit at the Interpersonal level corresponds to a single unit at the Representational level, which deals with the semantics of that unit. Subsequently, this single unit corresponds to a single unit at the Morphosyntactic Level, which is concerned with the morphosyntactic aspects, and to a single unit at the Phonological Level in which the encoding of every aspect that is not covered by the Morphosyntactic Level takes place. Thus, because of the interaction between the levels, relations may be transparent or non-transparent across all four of them. These relations arise between the relevant units that these levels consist of. The units at the Interpersonal Level are actional in nature and include: Discourse Acts, which are the smallest units of communicative behaviour; Illocutions, conventionalised communicative intentions; Ascriptive Subacts, which capture predication; and Referential Subacts, which capture reference. The units at the Representational Level are ontological in nature and include: States-of-Affairs, which are events or states that are locatable in space and time; Individuals, animate or inanimate entities locatable in space; and Properties, which only exist when applied to other ontological categories. The units at the Morphosyntactic Level are units of structure such as Clauses, Phrases, Words, Stems, and Affixes. Lastly, the

Phonological Level consists of prosodic units, including Intonational Phrases, Phonological Phrases, Phonological Words, Feet, and Syllables (Hengeveld & Mackenzie 2008; Keizer 2015).

Furthermore, transparent or non-transparent relations may also be present within levels, although this is only applicable to the form-based levels: the Morphosyntactic and Phonological Level, as is indicated with the symbol ‘ $\cup$ ’ in Figure 1 above. Within these levels, operations may occur that add elements or features to the structures that have no interpersonal or representational counterpart. That is, they have form but no meaning, which is considered to be opaque (Hengeveld 2011; Hengeveld & Leufkens 2018; Hengeveld & Mackenzie 2008). To illustrate some of the relations discussed above, consider the English example (1).

- (1) It was raining when John, my brother, drove to school.

This sentence contains a number of non-transparent or opaque features and a few will be exemplified. (The terms non-transparent and opaque will be used interchangeably in this study.) Firstly, the dummy subject *it* is inserted. This element does not contain any meaning, that is, there is no Interpersonal or Representational unit present, but nevertheless, a Morphosyntactic unit is expressed. Secondly, *John* and *my brother* both refer to the same entity, which means that there are two units at the Interpersonal Level corresponding to one unit at the Representational Level. Thirdly, an irregular verb form *drove* is present, which is non-transparent since a transparent mapping would result in *drived*, which is ungrammatical. Fourthly, the verb form *was* shows agreement with the subject, which creates double marking of person both on the verb and the subject. This results in multiple forms for the same meaning.

It is important to note that transparency is frequently confused with simplicity. However, complex structures may be fully transparent, whereas simple structures may be fully non-transparent. The Turkish example in (2) shows a very complex structure, but at the same time, it is fully transparent (Lewis 1967: 153).

- (2) *acı-n-dir-il-ma-dı-k*
 feel.pain-REFL-CAUS-PASS-NEG-PST-1.PL
 ‘We were not made to grieve.’¹

Another important remark is that, especially in the field of sign linguistics, transparency and iconicity are sometimes used interchangeably. Although both

¹ See Appendix 2 for the glossing conventions.

terms refer to a relation between form and meaning, they do not refer to the same phenomenon. In fact, iconicity refers to the predictability or guessability of a meaning by its form. Transparency, however, refers to the number of meanings expressed by forms and not to the predictability of meaning from form (Leufkens 2015; Pizzuto & Volterra 2000; Taub 2001).

In this study, I will investigate various transparency features that may arise in operations between the four levels and within the two form-based levels. The features under investigation will be explained and discussed in Section 5.

3 Sign languages

Sign languages only became object of systematic linguistic research in the 1960s. Stokoe (1960) was the first to describe various linguistic structures of American Sign Language (ASL). Once the first studies appeared, more researchers got interested and started to investigate an increasing number of sign languages. In Section 3.1, I describe the most important characteristics of signed languages in general, in addition to the relevant similarities and differences between spoken and signed languages. Because the focus of this study is on NGT, background information on this language is provided in Section 3.2.

3.1 *Characteristics of sign languages*

Despite the fact that signed languages function in a different modality of production and perception, they are similar to spoken languages with respect to many core properties. Signed languages display systematic structure at all levels of linguistic description. Phonology deals with the sublexical structure of signs, such as handshape, movement, location, and orientation, i.e. the components that signs are built from (Brentari 2012; Meir 2012), whereas phonetics refers to the articulation of signs (Crasborn 2001, 2012).

Morphology is concerned with meaningful units that form signs and may involve inflectional and/or derivational elements (Meir 2012). Syntactically, signs are combined into clauses, and grammatical processes such as agreement may be present (Leeson & Saeed 2012; Mathur & Rathmann 2012).

However, there are also some interesting differences between modalities, which make signed languages important to investigate, because they can provide other insights with respect to linguistic features, and therefore contribute to the knowledge of human language capacity in general. Firstly, signed languages exploit simultaneity on different linguistic levels rather than sequential structure, which largely characterizes spoken languages. Secondly, a striking feature of signed languages is the use of space for various grammatical and pragmatic processes such as localisation, pronominalisation, and verb agreement. When one talks about referents which are not physically present, the referent can be

assigned to an abstract location in signing space. This is called localisation, and it can be realised through a pointing sign (glossed as INDEX) or by articulating the sign at a specific location. Subsequently, these locations in signing space can be used for pronominal reference or verb agreement during discourse. Basically, the signing space is organised as in Figure 2 below.

Subscript 1 indicates the signer him- or herself; subscript 2 is associated with the addressee; and, moreover, the signer can assign (localise) referents to the abstract locations 3a or 3b. These assigned referents maintain their positions during the discourse. In the constructed NGT example (3), GIRL is assigned to location 3b in the first sentence. Several sentences later, the girl is referred back to with a pronominal pointing sign which targets the same location 3b.

- (3) GIRL INDEX_{3b} SING. (...) INDEX_{3b} LIKE DANCE TOO.
 ‘The girl is singing. She likes to dance too.’

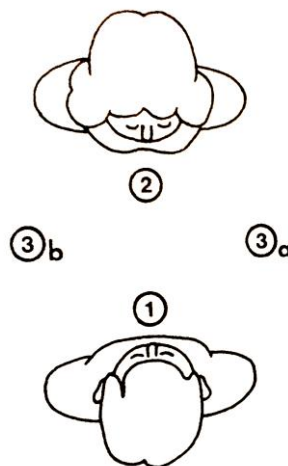


Figure 2: Locations of grammatical persons in signing space (Bos 1991: 149).

Additionally, in various sign languages, a class of verbs, the so-called agreement verbs, can be modified to express agreement with the referents associated with specific locations. The movement of the sign, the place of articulation of the sign, and/or the orientation of the palm of the hand or the fingers can be modified in order to mark the subject and/or the object of the sentence. Generally, the starting point of the sign corresponds to the location of the assigned subject and the endpoint to the location of the assigned object. In the constructed NGT example (4a), based on the online dictionary of NGT (Gebarencentrum 2017), WOMAN is subject, and in example (4b) WOMAN is object. The only difference is the direction of movement of the verb. In various sign languages, including NGT, there is a subclass of agreement verbs that show the opposite pattern. In these so-called backward verbs, the starting point of the sign corresponds to the location of the assigned object and the endpoint to the

location of the assigned subject. In example (5), the sign PICK-UP does not move from subject to object, but from object to subject (Corpus NGT: CNGT0049, S006).²

- (4) a. WOMAN INDEX_{3a} 3aANSWER₁
 ‘The woman answers me.’
- b. WOMAN INDEX_{3a} 1ANSWER_{3a}
 ‘I answer the woman.’
- (5) FATHER OTHER FRIEND ARRANGE₁PICK-UP₃
 ‘The father of another friend arranged that he would pick us up.’

Thirdly, an important feature of signed languages is the use of non-manual markers, such as facial expressions, body movements, and head movements for grammatical purposes. They may function as morphemes, for instance, to express adjectival or adverbial meaning. Non-manual markers may have a syntactic function, such as marking questions or negation, and they can be used to mark prosodic units (Kimmelman 2014; Pfau & Quer 2010). An example of a syntactic non-manual marker in NGT is provided in (6), in which the headshake (hs) expresses negation. Note that in some sign languages, including NGT, it is also possible to express negation with a non-manual marker only, thus without the lexical sign NOT (Oomen & Pfau 2017: 21).

- (6) INDEX₁ hs SICK NOT
 ‘I am not ill.’

Signing space and non-manual markers are also used for role shift. Role shift refers to segments of discourse in which the signer adopts the role of another participant. At that moment, the signer displays the actions, thoughts, feelings or expressions of the other. Role shift can be realised and signalled in various ways, for instance, by a change in facial expression, a head turn, body position, body shift (rotation of the body) or eye gaze (Cormier, Smith & Zwets 2013; Nijen Twilhaar 2009).

Classifiers are widely used across sign languages. They are also found in spoken languages, such as Mandarin Chinese and Japanese. However, a difference is that in signed languages only verbal classifiers exist. Generally, they are considered to be meaningful elements in morphologically complex structures. However, the complexity in these structures is not yet clear, and there

² Various proposals have been made to analyse this special class of backward verbs, see e.g. Bos (1998), Friedman (1975), Meir (1998, 2002), and Shepard-Kegl (1985).

is much controversy about how they should be analysed. Nevertheless, generally, two main categories of classifiers are distinguished: whole entity classifiers and handling classifiers. Whole entity classifiers directly represent the referent by denoting particular semantic and/or shape features, whereas handling classifiers occur with verbs that show the manipulation of a referent, and thus represent entities that are being held and/or moved (for further information see e.g. Zwitserlood 2012).

As a consequence of their modality, signed languages are assumed to be more iconic than spoken languages (e.g. Klima & Bellugi 1979; Perniss, Thompson & Vigliocco 2010). Since they operate in the visual-spatial modality, it is easier to display the shape of a referent than in the oral-auditory modality. Moreover, spatial relationships such as location, motion, and actions of entities are also considered to be more or less iconic. It is important, though, that iconicity seems to play no role in acquisition, recall, and recognition of signs in daily use (Taub 2012). Even more essentially, and already mentioned in Section 2, iconicity should not be confused with transparency. Various studies on sign languages have shown that iconicity is not an objective relationship between image and referent, i.e. it is not a one-to-one relationship between meaning and form. Rather, it is a relationship between mental models of image and referents (Pizzuto & Volterra 2000; Taub 2001).

In sum, the most important differences between spoken and signed languages are the exploitation of simultaneity, the use of space, predicative classifiers, iconicity, and the use of non-manuals. These modality differences make it interesting to add studies on signed languages regarding transparency within the framework of FDG.

3.2 *Sign Language of the Netherlands*

NGT is a natural, relatively young language, used by approximately 16.000 people in the Netherlands, most of which are deaf or hard-of-hearing (Crasborn 2001). It does not have an official legal status yet.

NGT arose when the first school for deaf children was established in 1790 in Groningen. The founder of the school, Henri Daniël Guyot, copied the signing method to teach deaf children from Abbé de l'Épée, who established the first school for deaf children in France. The signing system was initially designed to follow the pattern of spoken Dutch, but over time the signs used by the deaf children were taken over. During the 19th century and the beginning of the 20th century, four more schools were opened in Sint-Michielsgestel, Rotterdam, Leiden, and Amsterdam. The latter three predominantly used the oral method of education in which signing was not allowed. Although the input of sign language was limited, children kept signing among each other. In the 1980s, the use of all available means of communication, i.e. sign language,

spoken language, and signing systems, was stimulated in the total communication method, which is currently still used (Fortgens 1991; Rietveld-van Wingerden 2003; Rietveld-van Wingerden & Tijsseling 2010). Corresponding to the fact that there are five deaf schools, NGT exhibits regional lexical variation. As for grammatical differences, very little is known.

NGT has been relatively well studied. However, numerous topics need further analysis or have not been investigated at all. Transparency within the framework of FDG has not received any attention yet, and in order to fill this gap, I will focus on transparency in NGT.

4 Research questions and method

To date, no sign language has been studied with respect to its degree of transparency within the FDG framework. Therefore, this exploratory research focuses on one particular sign language, namely NGT. In Section 4.1, I will outline the research questions and the method of investigation will be explained in Section 4.2.

4.1 Research questions

This study starts out measuring the degree of transparency of NGT, by investigating whether NGT exhibits transparency or non-transparency of various features. Subsequently, the following research questions will be examined: (i) Can we establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages? On the basis of the results for (i), a second question can then tentatively be answered: (ii) Are transparency patterns modality-specific?

4.2 Method of investigation

As mentioned in Section 2, transparency or opaqueness may arise in the operations that apply to all four levels of FDG: Interpersonal, Representational, Morphosyntactic, and Phonological. It may also originate within the levels of encoding, namely the Morphosyntactic Level and the Phonological Level. I distinguish between transparent and non-transparent features that arise between and within levels.

Firstly, I determined which features to investigate for NGT, based on the study by Hengeveld & Leufkens (2018). Note that the list of features is not exhaustive, and that the starting point is the presence of non-transparent features rather than transparent features. This means that the features are formulated in terms of opaqueness because the phenomena I investigate imply non-transparency if they are present, and transparency if they are absent. The

features under investigation are listed and explained in Section 5. To analyse the presence or absence of these features, I consulted existing research on NGT, and made extensive use of the Corpus NGT, which is a database of recordings of signers (Crasborn & Zwitserlood 2008; Crasborn, Zwitserlood & Ros 2008).

Secondly, to establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages, a comparison was made between the results of this study and the results of the study of Hengeveld & Leufkens (2018). They studied 30 languages, which are listed in Appendix 1.

Thirdly, by analysing potential differences between the transparency of features in spoken languages and NGT, I will formulate tentative conclusions regarding possible modality-specific influences. However, because this is the first study of transparency in one particular sign language, it is important to emphasise that these will be speculations which need to be further examined by investigating transparency in other signed languages.

5 Transparency features of NGT

In order to answer the research questions, the investigated transparency features are explained and subsequently discussed for NGT. In Section 5.1, I zoom in on transparency features originating in operations between levels. Features within the form-based levels are clarified and discussed for NGT in Section 5.2. Finally, a concise summary is provided in Section 5.3

5.1 Transparency features originating in operations between levels

As mentioned in Section 2, the four levels within FDG interact with each other, and therefore the relations between them may be transparent or opaque. In Figure 1, it has been shown that there are relations between the following levels: (i) Interpersonal – Representational, (ii) Interpersonal – Morphosyntactic, (iii) Interpersonal – Phonological, (iv) Representational – Morphosyntactic, (v) Representational – Phonological, and (vi) Morphosyntactic – Phonological. Because of the top-down principle of FDG, these relationships will be grouped in terms of the endpoint of the relation. This results in the following groupings:

Interpersonal – Representational → Section 5.1.1

Interpersonal & Representational – Morphosyntactic → Section 5.1.2

Interpersonal & Representational & Morphosyntactic – Phonological
→ Section 5.1.3

5.1.1 Interpersonal – Representational

Apposition

Appositional constructions are combinations of two or more elements that refer to the same entity, and importantly, they might do so independently of each other. In cases of non-restrictive appositions, there is a non-transparent mapping between the Interpersonal and Representational Level, because two units at the Interpersonal Level correspond to one single unit at the Representational Level (e.g. Hannay & Keizer 2005).³ An example of English is provided in (7) in which *the Sahara* and *the most famous desert of the world* refer to the same entity.

- (7) Jan is born in the Sahara, the most famous desert of the world.

Apposition in NGT

NGT exhibits a non-transparent mapping between the Interpersonal Level and the Representational Level. In example (8), GUYOT, which is the name of a deaf school in Groningen, and OLD SCHOOL THERE GRONINGEN both refer to the same entity. Similarly, examples (9) and (10) display two units at the Interpersonal Level, namely WIM and MY SON, and J.W. and (that) WOMAN which correspond to one and the same entity at the Representational Level. Therefore, NGT is opaque concerning this feature.

- (8) GUYOT OLD SCHOOL THERE GRONINGEN GROW-UP
 ‘At Guyot, the old school there in Groningen, I grew up.’
 (Corpus NGT: CNGT0245, S014)
- (9) WIM MY SON ALSO ACTIVE DEAF STILL LEAVE SWIM
 ‘Wim, my son, was also active (at the swimming club), but still many deaf (people) left.’
 (Corpus NGT: CNGT0013, S004)
- (10) J.W. WOMAN COME $\overline{\text{TRUST INDEX}_1}$ ⁴
 J.W., that woman, came and did not trust me.
 (Corpus NGT: CNGT0284, S018)

³ All information about this feature and the following features that will be discussed and explained are based on the following references: Hengeveld (2011), Hengeveld & Leufkens (2018), Hengeveld & Mackenzie (2008), Keizer (2015), and Leufkens (2015). If additional references were used, this is explicitly mentioned.

⁴ In this particular example (10), the name of a woman is fully expressed. For privacy reasons, the abbreviation J.W. is used.

Cross-reference

Cross-reference is closely related to apposition in the sense that two elements refer to the same entity. As for cross-reference, a referential person marker on a verb optionally occurs with a verb-external noun phrase. In example (11a) of Bardi, a language spoken at the tip of the Dampier Peninsula (Bower 2012: 394), it can be noticed that the verb by itself constitutes a complete utterance, and that the first prefix and clitic can refer by themselves. In (11b) an example is provided in which *a blue-ringed octopus* is added to the verb for further specification of the participants (Bower 2012: 404). In the latter case, the argument is expressed both lexically and grammatically. Therefore, two units at the Interpersonal Level correspond to one single unit at the Representational Level, which shows a non-transparent relation.

- (11) a. *I-na-m-boo-na=ngay*
 3-TR-PST-hit-REM.PST=1M.DO
 ‘He/she/it hit me.’
- b. *Ngoojili-nim* *i-na-m-boo=jarrngay*
 blue-ringed.octopus-ERG 3MIN-TR-PST-hit-1M.DO
 ‘A blue-ringed octopus stung me.’

Cross-reference should be distinguished from clausal agreement, which I discuss in Section 5.2.1 as a morphosyntactic feature. In that case, the person marker is not referential, but a grammatical copy of the noun phrase argument.

Cross-reference in NGT

Cross-reference is present in NGT. In examples (12a) and (13a), it is shown that a verb can be modified such that it may express a complete utterance itself.⁵ The agreement markers can refer by themselves. However, the verb may occur with a verb-external noun phrase as well, in (12b) with the noun *FRIEND*, and in (13b) with *WOMAN*. Because the argument can be expressed lexically and grammatically within one clause, NGT is non-transparent with respect to this feature.

⁵ Note that not all verbs in NGT can be modified to express a complete utterance by themselves. Depending on the verb class to which the verb belongs, the verb may not be modified at all, partially modified, or completely modified. Also, if a verb can be modified, it is not obligatory. For further information, see Section 5.2.1, and e.g. Bos (1993), van Gijn (2004), Legeland (2016), and Zwitserlood & van Gijn (2006).

- (12) a. ${}_{3b}\text{VISIT}_1$
‘He/she visits me.’ (Corpus NGT: CNGT0004, S003)
- b. $\text{FRIEND } {}_{3B}\text{VISIT}_1$
‘A friend visits me.’ (Corpus NGT: CNGT0386, S019)
- (13) a. ${}_{3b}\text{LOOK-AT}_1$
‘He/she looks at me.’ (Corpus NGT: CNGT0094, S001)
- b. $\text{WOMAN } {}_{3b}\text{LOOK-AT}_1$
‘A woman looks at me.’ (Corpus NGT: CNGT0208, S012)

5.1.2 Interpersonal & Representational – Morphosyntactic

A semantic or pragmatic alignment system lines up semantic/pragmatic units and syntactic units in such a way that they are always expressed the same independently of the syntactic configuration, which shows a transparent relationship. In a semantic alignment system, semantic roles such as Actor and Undergoer are marked consistently by morphosyntax. In a pragmatic alignment system, pragmatic functions like topic and focus are consistently marked by morphosyntax. On the other hand, languages may exhibit non-transparent relationships when semantic/pragmatic units are expressed differently depending on their syntactic organisation (e.g. Donohue 2008). A semantic alignment system is exhibited in Batsbi/Tsova-Tush, a minority language spoken in Georgia. In examples (14ab), it can be seen that in the same syntactic construction, the Actor is marked differently from the Undergoer (Nichols 2006: 263-264, slightly adapted). The semantic units are thus expressed differently based on semantic considerations rather than their syntactic configuration, which shows transparency.

Grammatical relations in NGT

functions are not consistently marked, NGT does not exhibit a pragmatic alignment system (Kimmelman 2015).

Secondly, semantic roles are also not consistently marked, as they are in e.g. Batsbi/Tsova-Tush, as mentioned above. In the examples (15ab), the same constituent [INDEX₁ BROTHER INDEX_{3a}] is expressed, but in (15a) it is the Agent of the sentence, while in (15b), it has the semantic role of Patient. Nevertheless, the semantic roles are not marked differently. This particular constituent does not only differ in its semantic role, but also in its grammatical role: in (15a) it is the subject, and in (15b) the object of the sentence (Pfau & Bos 2016: 123).

- (15) a. TOMORROW [INDEX₁ BROTHER INDEX_{3a}]_{Agent} MOVE
 ‘My brother is moving tomorrow.’
- b. SUNDAY [INDEX₁] [INDEX₁ BROTHER INDEX_{3a}]_{Patient} MEET
 ‘On Sunday, I will meet my brother.’

When a language exhibits a grammatical alignment system, only co-referential subjects can be omitted in the second conjunct of a coordinated sentence. English, for instance, exhibits a grammatical alignment system, and therefore, sentence (16a) is grammatical, but (16b) is not.

- (16) a. Father visited mother and ___ returned.
 b. * Father returned and mother visited ___.

It appears that this is also the case for NGT, although it is a bit more complicated because of the different verb types. In the constructed example (17), the same coordinated sentence as the English example (16b) is given in NGT. The sentence in (17a) is ungrammatical, just as the English example. Nevertheless, it is possible to modify the verb such that the sentence becomes grammatical. As explained in Section 3.1, some verbs in NGT may express agreement with their argument(s) by modifying the movement and/or orientation of the sign. VISIT is an agreement verb, and in order to express a grammatical coordinated sentence, one has to modify this verb such that it agrees at least with the omitted argument as is displayed in example (17b).

- (17) a. * FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} VISIT ___
 * ‘Father returned and mother visited ___.’
- b. FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} (3b)VISIT_{3a}
 ‘Father returned and mother visited him.’

However, not all verbs can be modified to express agreement. The so-called plain verbs in the examples (18) and (19) cannot be spatially modified to express agreement with subject and/or object. Nevertheless, other devices can be used in order to indicate the grammatical role of subject and object. NGT has an auxiliary AUX-OP (illustrated in Figure 3), which can express agreement with subject and/or object (Bos 1994). Therefore, AUX-OP is used in (18b) to express agreement with at least the omitted argument.

- (18) a. * FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} LOVE ____
 * ‘Father returned and mother loves ____.’
- b. FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} LOVE (3b)AUX-OP_{3a}
 ‘Father returned and mother loves him.’

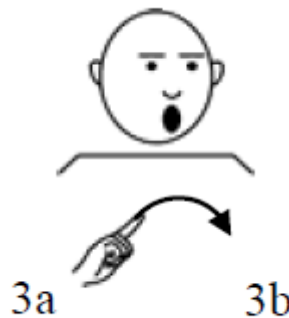


Figure 3: Illustration of the NGT auxiliary AUX-OP (Steinbach & Pfau 2007: 316).

Another possibility is demonstrated in (19). THINK-ABOUT is a plain verb as well, and thus, cannot be modified to express agreement with subject and/or object. Therefore, in (19b), a copy of the INDEX_{3a} is expressed to refer back to FATHER.

- (19) a. * FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} THINK-ABOUT ____
 * ‘Father returned and mother thinks ____.’
- b. FATHER INDEX_{3a} RETURN, MOTHER INDEX_{3b} THINK-ABOUT INDEX_{3a}
 ‘Father returned and mother thinks about him.’

Yet another possibility is to use non-manual marking. That is, signers may turn their body towards the location of FATHER while producing the verb.

In sum, in order to produce a grammatical coordinated sentence in which the subject of the first conjunct is not lexically expressed in the second conjunct, signers have to indicate what the grammatical roles of the arguments are. They do this by, for instance, the use of the auxiliary, a copy of the index, modifying

verbs to express agreement, or non-manual incorporation.⁶ For this reason, NGT exhibits a grammatical alignment system and is non-transparent regarding this feature.

Discontinuity

In transparent relations between the Interpersonal & Representational Levels and the Morphosyntactic Level, a single unit of the former Levels is mapped to a single unit at the latter. However, when discontinuity occurs, the so-called domain integrity is violated because elements that belong together at the pragmatic and semantic level are realised separately in morphosyntax. Operations such as extraposition, extraction, and raising may cause discontinuity.

Extraposition is the process in which a modifying constituent is realised at the end of the sentence rather than adjacent to its head. This is the result of the preference of realising long and/or complex structures near the end of a sentence. Extraction on the other hand, occurs when a modifying constituent is realised near the beginning of the sentence, to the left of its head. This process is usually the result of topicalisation (e.g. Ross 1967; van de Velde 2012). An example of Dutch is presented in (20), in which the square brackets indicate an extraposed prepositional phrase in (20b), and an extracted prepositional phrase in (20c) (van de Velde 2012: 434-435).

- (20) a. *Ik heb twee boeken over Amsterdam gelezen*
 I have two books about Amsterdam read
 ‘I have read two books about Amsterdam.’
- b. *Ik heb twee boeken gelezen [over Amsterdam]*
 I have two books read about Amsterdam
 ‘I have read two books about Amsterdam.’
- c. *[Over Amsterdam] heb ik twee boeken gelezen*
 about Amsterdam have I two books read
 ‘About Amsterdam I have read two books.’

Raising occurs when an argument that semantically belongs to an embedded clause behaves as an argument of the main clause. This results in a construction in which the argument is not adjacent to the predicate anymore. Although they form a single unit at the semantic level, they are morphosyntactically realised as

⁶ I would like to thank the native signers who have contributed to this paragraph about grammatical relations by providing their valuable comments and additional information.

two units (e.g. Velasco 2013). In (21a) below, the main clause contains the dummy subject *it*, and the subject of the embedded clause is *the horses*. In example (21b), raising occurs, because the subject of the embedded clause behaves syntactically as the subject of the main clause (Leufkens 2015: 66).

- (21) a. It seems that the horses are ill.
b. The horses seem to be ill.

All these operations ensure opaqueness, because one semantic or pragmatic unit corresponds to two non-adjacent morphosyntactic units. In other words, one unit of meaning is not realised as one unit of form.

Discontinuity in NGT

Discontinuity occurs frequently in NGT. Extraction realised by means of topicalisation is a common phenomenon. Examples (22ab) display topicalisation in NGT, which results in extraction and thus discontinuity (van Gijn 2004: 163, slightly adapted).

- (22) a. ______t
AMERICA INGE LIKE MARIJKE INDEX_{3b} GO-TO
'As for America, Inge likes that Marijke goes there.'
- b. ______t
BOOK INDEX_{3b} TWO.OF.US YESTERDAY SEE MAN STEAL
'As for the book, the two of us saw the man stealing (it) yesterday.'

5.1.3 Interpersonal & Representational & Morphosyntactic – Phonological

Phonological and morphosyntactic phrasing do not run parallel

An utterance is transparent if there is a one-to-one mapping between morphosyntactic and prosodic units. This results in correspondence between one lexeme and one phonological word, and one morphosyntactic phrase to one phonological phrase. Example (23) from Dutch displays a non-transparent relation, because the subject and the verb form one phonological word, just as the conjunction and the subordinate subject, as can be seen in (23b) which represents the phonetic realisation of the sentence (Hengeveld & Leufkens 2018: 149).

- (23) a. *Ik wou dat hij kwam*
 I want.PST COMP he come.PST
 ‘I wish he would come.’
- b. [kʷau dati kʷam]

Phonological and morphosyntactic phrasing do not run parallel in NGT

As mentioned in Section 3.1, NGT exhibits a range of non-manual markers. They have various functions, and one of them is the marking of negation by means of a headshake. In subordinated clauses, the non-manual marker may or may not spread over the subordinated clause, even when only the main clause is negated. In examples (24ab), the non-manual negation marker stretches over the whole sentence that contains two predicates. However, there is no negation involved in the second clause (van Gijn 2004: 114, slightly adapted). The main clause is one morphosyntactic unit, and the subordinated clause is a separate morphosyntactic unit, but phonologically, the non-manual marker may spread over both of them, and therefore does not run parallel.

- (24) a. neg
 TWO.OF.US PRETEND JOHN ILL
 ‘The two of us do not pretend that John is ill.’
- b. neg
 PROFESSOR KNOW GOBLIN EXIST
 ‘The professor does not know that goblins exist.’

Similar, in simple clauses, the headshake may occur only with the verb, or may spread over the verb and the object. The latter results in non-parallelism between one lexeme and one phonological word. Examples are provided in (25), with the non-manual marker merely occurring with the verb in (25a), while in (25b), it spreads also over the object (van Gijn 2004: 110, slightly adapted). In sum, NGT is non-transparent regarding this feature.

- (25) a. neg
 MAN INDEX_{3a} PRESENT _{3a}GIVE_{3b}
 ‘The man does not give her a present.’
- b. neg
 MAN INDEX_{3a} PRESENT _{3a}GIVE_{3b}
 ‘The man does not give her a present.’

Morphophonologically based stem or affix alternation

When boundaries between individual morphemes within a word are maintained, transparency is present between meaning and form. However, when fusion occurs, two or more aspects of meaning are expressed in one form, and a transparent relation does no longer hold. Cumulation, which will not be further examined in this study, refers to the process in which multiple grammatical meanings are expressed within one morpheme. Stem or affix alternation is another type of fusion and occurs when the stem or an affix of a lexeme has a different form in different morpho(phono)logical circumstances. This latter type of fusion will be investigated in this study.

The presence of morpho(phono)logically conditioned stem or affix alternation is largely determined by the type of language. Fusional languages are opaque either way, because in those languages this feature is always present. In isolating languages, stem or affix alternation does not occur and they are transparent regarding this feature. As for agglutinative languages, it is expected to be limited, because they are somewhere in the middle of the continuum between fusional and isolating languages (e.g. Hengeveld 2007).

In morphophonologically based stem alternations, a stem of a lexeme is influenced by the presence of a specific affix or set of affixes. In morphophonologically based affix alternation it is the other way around, namely the specific affix or set of affixes is phonologically affected (e.g. Hengeveld 2007). In (26), a Dutch example is presented in which the choice of the plural suffix (–*en* versus –*s*) depends on the stem of the particular lexeme.

- | | | |
|------|-----------------|----------------|
| (26) | <i>stoel-en</i> | <i>tafel-s</i> |
| | chair-PL | table-PL |
| | ‘chairs’ | ‘tables’ |

Note that, in this section, the focus is only on morphophonologically based stem or affix alternation and not on morphologically based stem or affix alternation (which will be discussed in Section 5.2.1). Morphophonologically based stem or affix alternation takes place at the interface between morphosyntax and phonology, because the phonological alternations are triggered by specific morphological circumstances.

In sum, when morphophonologically conditioned stem or affix alternation occurs, an element from the Morphosyntactic Level is realised in different forms in different environments at the Phonological Level, and thus opaque.

Morphophonologically based stem or affix alternation in NGT

In NGT, morphophonologically based stem alternation is present. The realisation of plurals depends on the phonological properties of the base noun.

One way to express plurality is to reduplicate the noun (partially). However, an important phonological restriction is that signs with a complex movement in their citation form cannot be reduplicated to express plurality (Harder, Koolhof & Schermer 2003). This means that nouns that already have a repeated or alternating movement, such as RESTAURANT and BICYCLE, are pluralised by other means in contrast to nouns with no such complex movement, such as BOOK and CHILD. Figure 4 displays the citation form of BICYCLE in NGT, which has an alternating movement in its citation form, and therefore the plural form cannot be realised by reduplication, but has to be realised otherwise, for example, by means of using a numeral, quantifier, or a classifier construction. In contrast, in Figure 5, image (a) displays the citation form of BOOK, and image (b) shows the reduplicated plural form, indicated by the double arrows.

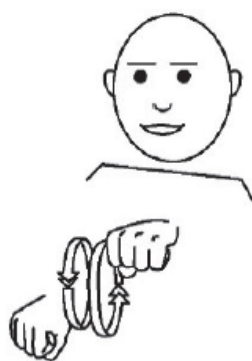


Figure 4: The citation form of BICYCLE (Pfau 2016: 218).

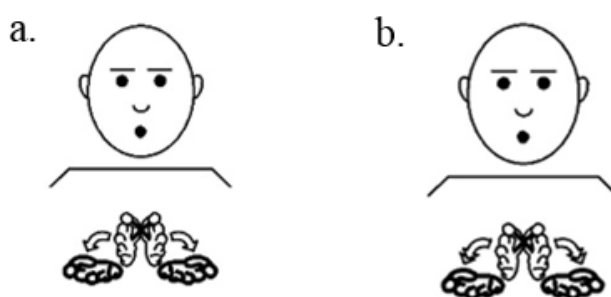


Figure 5: The citation form (a) and the plural form (b) of BOOK realised by reduplication (Pfau 2016: 216).⁷

5.2 *Transparency features originating in operations within levels*

Besides transparent and non-transparent relations between the levels discussed in the previous section, in Section 2, I briefly discussed that such relations may

⁷ In the mentioned reference, this image represents BOOK(S) in German Sign Language (DGS). However, both the citation form and the plural form are identical in NGT.

also be present within the two form-based levels: the Morphosyntactic and Phonological Level. At these levels, operations take place in which elements are added to units that are already built up. However, these extra components have no Interpersonal or Representational counterpart. This means that these elements have a form but no meaning, and therefore exhibit opaqueness. Multiple features that may arise within the Morphosyntactic Level will be discussed in Section 5.2.1, and the operations that may take place within the Phonological Level will be discussed in Section 5.2.2.

5.2.1 *The Morphosyntactic Level*

Expletive elements

Various languages allow the insertion of a dummy element at the Morphosyntactic Level. These elements do not have a semantic or pragmatic counterpart, that is, no Interpersonal or Representational material is available. Languages that allow these operations are opaque concerning this feature. A transparent strategy is not to use these filler items as illustrated in example (27) of Fongbe (Lefebvre & Brousseau 2002: 245).

- (27) *jì jà*
 rain fall
 ‘It is raining.’

In the English translation, it becomes immediately clear that the expletive pronoun *it* is inserted, which is considered to be non-transparent. This nominal insertion is purely syntactically motivated and therefore operates within the Morphosyntactic Level. Other kinds of expletives may also be verbal rather than nominal. However, these verbal expletives frequently have a functional motivation, as they are used to carry tense, aspect or mood specifications. In this study, I will focus on nominal expletives in weather predicates.

Expletive elements in NGT

In NGT, nominal expletive elements are not used in combination with weather predicates (Pfau & Bos 2016: 120), as illustrated in examples (28) and (29) from the Corpus NGT. Therefore, NGT can be considered transparent with respect to this feature.

- (28) IF RAIN PRETTY SLIPPERY
 ‘If it rains, it will be pretty slippery.’

(Corpus NGT: CNGT0319, S015)

(29) NEXT MORNING SNOW

‘The next morning it was snowing.’

(Corpus NGT: CNGT0208, S012)

Morphologically based stem or affix alternation

An alternation which itself expresses a morphological distinction, as in the case of suppletion and irregular stem formation, is a morphologically based stem or affix alternation. Suppletion is a morphological process in which more than one stem form is used that cannot be derived from one another. The form that is chosen depends on the grammatical information that has to be encoded. Consider the English verb *go* from which the other forms *goes*, *gone*, and *going* can be derived. The past tense *went* has a completely different stem and is therefore suppletive. In this case, the verbal stem does not only express the lexical meaning of the root, but also tense and aspect information (Lieber 2009).

Irregular stem formation refers to the modification of a part of the stem, such as in the English *mouse* (singular) – *mice* (plural). These kinds of alternations apply to particular stems, but not to all, because usually plurality is expressed with the suffix –s. Therefore, the lexical meaning of the stem and the grammatical meaning, which is marked by the alternation cannot be separated, is expressed within one form, and is considered to be opaque.

As for affix alternation, in many languages, this appears in conjugation and declension classes. Conjugation is the phenomenon that the form of an affix depends on the verbal class of a stem. French, for instance, has three different verb classes and each class has a particular pattern of conjugation as is shown in example (30). Declension is the classification of nouns on the basis of the affixes they take, or vice versa, the classification of affix alternation on the basis of nominal classes, such as in Latin or Polish.

- (30) a. *parl-er* *je parl-e*
 speak-INF I speak-1SG.PRS
 ‘to speak’ ‘I speak’
- b. *chois-ir* *je chois-is*
 choose-INF I choose-1SG.PRS
 ‘to choose’ ‘I choose’
- c. *vend-re* *je vend-s*
 sell-INF I sell-1SG.PRS
 ‘to sell’ ‘I sell’

Morphologically based stem or affix alternation in NGT

NGT is opaque regarding this feature. Firstly, irregular stem formation may occur. Usually, verbs do not carry tense information, but instead an adverbial is used. However, the verb HAPPEN is exceptional in this respect: when articulated with a circular movement forwards, it indicates that something is happening now or will happen in the future. In contrast, if the sign is articulated with the reversed circular movement towards the signer's body, it indicates that something has happened in the past (Pfau 2016: 207).

Suppletion occurs in what is called negative suppletives. A positive form and a corresponding negative form are completely different and cannot be related to each other by any morphological process. Therefore, suppletive negatives have no overt morphologically marking for negation and more than one stem form is used within a paradigm that cannot be derived from one another (Zeshan 2004). Negative suppletives can also be found in NGT, for instance, WIN and LOSE (Figure 6ab) or MAY and MAY-NOT (Figure 7ab).



Figure 6: The NGT signs WIN (a) and LOSE (b) (Gebarencentrum 2017).

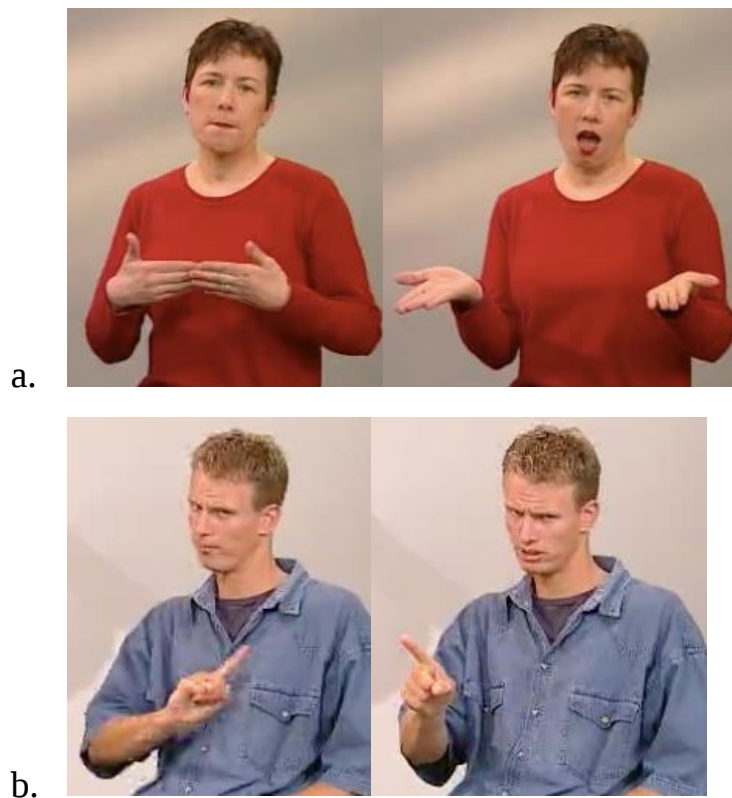


Figure 7: The NGT signs MAY (a) and MAY-NOT (b) (Gebarencentrum 2017).

Secondly, in sign languages, including NGT, verbs can be classified into three categories: plain verbs, spatial verbs, and directional verbs. This classification is based on a combination of properties of the particular verbs. Depending on the category, verbs may be modified to express agreement or not (Bos 1993; Padden 1988). Plain verbs, which are usually body-anchored, cannot be modified to mark their arguments. The NGT plain verb UNDERSTAND is displayed in Figure 8, and in (31) a context in which it is used is presented (Pfau 2016: 212).



Figure 8: The citation form of the plain verb UNDERSTAND in NGT (Gebarencentrum 2017).

- (31) INDEX₁ COLLEAGUE INDEX_{3b} ^{neg} ASSIGNMENT UNDERSTAND
 'My colleague does not understand the assignment.'

As for spatial and directional agreeing verbs, semantically, they must denote some kind of (abstract) movement or transfer. Spatial verbs can express agreement with locative arguments by modifying the movement or the orientation of the stem. In (32), a constructed example is given of the modified verb PUT. The starting point of the sign is the locus associated with the addressee, and the endpoint is the locus associated with TABLE.

- (32) BOOK INDEX₂ TABLE_{3b} 2PUT_{3b}
 'Put the book on the table.'

Similarly, directional verbs can express agreement with subject and/or object by modifying the movement and/or orientation of the stem. Image (a) in Figure 9 displays the citation form of ASK. The starting point is close to the body of the signer, and the endpoint is in neutral space. In contrast, image (b) shows that the sign is modified such that the starting point marks the subject, which in this case is localised at location 3 in signing space, and the endpoint marks the object, which is the signer himself, see example (33).



Figure 9: Image (a) displays the citation form of ASK in NGT (Gebarencentrum 2017). Image (b) displays a modified form of the verb ASK to express agreement with subject and object (Corpus NGT: CNGT0767, S038).

- (33) INDEX₃ 3VRAGEN₁ INDEX₁
 'He asked me.' (Corpus NGT: CNGT0767, S038)

Grammatical gender

Languages may exhibit a grammatical gender system, a semantically motivated gender system or no gender system at all. The semantically motivated gender system is systematic and considered transparent. A language that exhibits a

semantic gender system is Bininj Gun-Wok, an Australian Aboriginal language. This language has four semantically based genders, which are realised by means of prefixes. In example (34), three are shown: (34a) displays masculine gender, (34b) feminine gender, and (34c) vegetable gender (Evans 2003: 186, cited in Hengeveld & Leufkens 2018: 154). In this system, the gender marking of a noun is determined by its semantics and therefore transparent in the mapping from the Representational to the Morphosyntactic Level.

- (34) a. *na-gohbanj*
I-old
'old man'
- b. *al-gohbanj*
II-old
'old women'
- c. *an-gohbanj*
III-old
'old tree'

A language that exhibits a grammatical gender system is Dutch, which is illustrated in example (35). Morphologically, Dutch has two genders, a common gender *de* and a neuter gender *het*. This subdivision of nouns does not follow from their semantics, as is shown by (35c) and (35d). Both are from the same semantic domain, but nevertheless they exhibit different genders. Grammatical gender assignment is non-transparent as it is a property of the noun itself.

- (35) a. *het* *meisje*
DEF.NEUT girl
'the girl'
- b. *de* *jongen*
DEF.COMM boy
'the boy'
- c. *het* *voertuig*
DEF.NEUT vehicle
'the vehicle'
- d. *de* *auto*
DEF.COMM car
'the car'

Grammatical gender in NGT

In contrast to some Asian sign languages, which may use classifiers to mark gender in certain classes of signs (e.g. Fischer (2000) for Nihon Syuwa (Japanese Sign Language); Smith (1989) for Taiwan Sign Language), NGT does not have distinct hand configurations for masculine and feminine referents (Zwitserlood 2003). Gender marking is absent in NGT (Bos 1993; Perniss, Pfau & Steinbach 2007). An arbitrary classification such as in Dutch is not present, and consequently, NGT is considered as transparent regarding this feature.

Phrasal agreement

Phrasal agreement concerns operations in which a feature of a noun is copied to other elements of the noun phrase. This phenomenon is non-transparent, because two different forms do not correlate with a difference in meaning. Common properties of nouns that frequently trigger this type of agreement are definiteness, gender, and case. An example of phrasal agreement can be found in Spanish. In (36a), the noun *house* triggers feminine agreement on the adjective *red*, whereas the noun *car* triggers masculine agreement, as is illustrated in (36b) (Montrul, Foote & Perpiñán 2008: 509).

- (36) a. *la casa roj-a* b. *el auto roj-o*
 the.F house(F) red-F the.M car(M) red-M
 ‘the red house’ ‘the red car’

Phrasal agreement in NGT

In this extensive research, I did not find evidence for phrasal agreement in NGT. No features of nouns are copied onto other elements of noun phrases. NGT has no gender-marking, case-marking, or marking of definiteness. Below, the examples (37) and (38) show a few noun phrases with adjectives in NGT, but no phrasal agreement occurs. We thus conclude that NGT is transparent concerning this feature.

- (37) a. RED JACKET, RED HAT
 ‘red jacket, red hat’ (Corpus NGT: CNGT2146, S086)
- b. YELLOW BIRD
 ‘yellow bird’ (Corpus NGT: CNGT1895, S077)
- (38) a. OLD BROTHER
 ‘(my) oldest brother’ (Corpus NGT: CNGT0298, S018)
- b. OLD SISTER
 ‘(my) oldest sister’ (Corpus NGT: CNGT0313, S016)

Interestingly, although not a property under discussion in this investigation, NGT does exhibit semantic agreement within the use of classifiers. The handshape of a classifier is specified for some semantic features of the noun it refers to. According to Zwitserlood (2003), there are three types of feature specifications: (i) features indicating animacy and leggedness; (ii) features indicating shape; and (iii) features indicating the amount of control exercised by a manipulator.

To illustrate, Figure 10 represents two instances of referents that are falling. Image (a) displays a human entity that is falling, and image (b) displays a book that is falling. The handshape of the left classifier is specified for leggedness, whereas the right classifier is specified for shape. These examples may look like instances of phrasal agreement, but remember that NGT does only exhibit verbal classifiers. With the use of such classifiers, we are dealing with a semantic system rather than copying a feature of a noun onto other elements of the noun phrase.

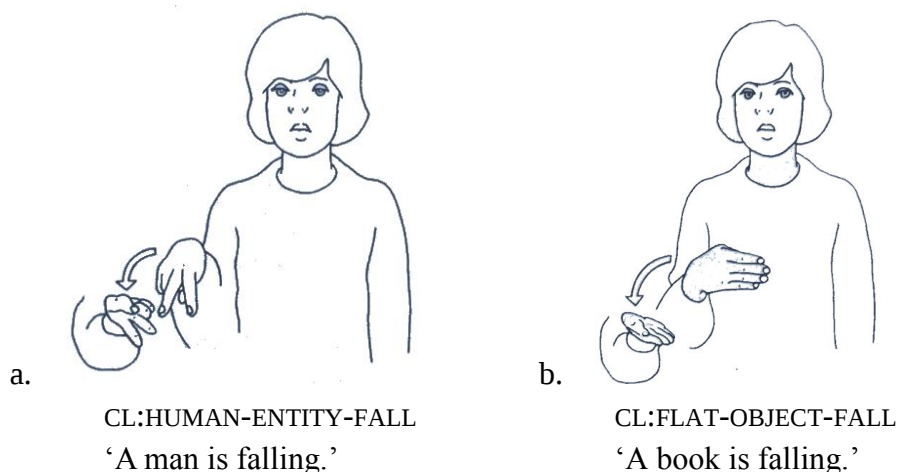


Figure 10: Images of two classifier predicates in NGT (Schermer 1991a: 125).

Clausal agreement

Within FDG, clausal agreement is defined as a copying operation at the Morphosyntactic Level in which a property of an argument is copied to another unit within the clause. This results in an empty element, because it does not have a counterpart at a higher level. In example (39) of Dutch below, there is a subject marker on the verb but a free pronoun as well. In Dutch, it is ungrammatical to leave the free pronoun out. Therefore, the suffix on the verb can be seen as pure copying, because it adds no extra meaning to the sentence and is therefore non-transparent.

- (39) * (Hij) zwem-t
 he swim-PRS.2SG/3SG
 'He swims.'

It is important not to confuse clausal agreement with cross-reference, as discussed in Section 5.1.1. Cross-reference obtains when person marking on the verb is sufficient by itself and may optionally be expanded by a lexicalised argument, whereas in clausal agreement the copied element needs to be present, although it does not contribute to the meaning of the sentence.

Clausal agreement in NGT

Clausal agreement is absent in NGT, and for that reason NGT is transparent regarding this feature. Although agreement may occur between a verb and its arguments, the arguments can be left out, as has been illustrated in examples (12) and (13). NGT is a prodrop language, and therefore, the copied element does not need to be present (e.g. Bos 1993; van Gijn 2004; Zwitserlood & van Gijn 2006).

Tense copying

Tense copying involves copying the tense of the main clause to the embedded clause, as illustrated in the English translation of the Russian example (40) (Comrie 1986: 275, cited in Leufkens 2015: 61, slightly adapted). The past tense of the main clause is expressed on the embedded verb as well. This is non-transparent in the sense that the past tense marker of the main verb is copied to the embedded verb. The Russian sentence shows transparency because the tense that is marked on the verb in the embedded clause contains the relative tense that takes the tense of the main clause as its deictic centre. The embedded tense shows that at the time of speaking, the action of dancing was in the present.

- (40) *Tanja skaza-l-a, čto ona tancu-et.*
 T. say-PST-F that she dance.PRS-3SG
 ‘Tanja said that she was dancing.’

Tense copying in NGT

In NGT, tense is not grammatically marked. To indicate that something has happened in the past or will happen in the future, adverbials such as YESTERDAY or TOMORROW are generally used. Tense copying is only possible if a language exhibits grammatical tense, which is not the case for NGT (e.g. Brunelli 2011: 101; Schermer 1991b: 133). This means that NGT is transparent regarding this feature. To illustrate how adverbials are used to indicate tense, see examples (41) and (42).

- (41) INDEX₁ SEE YESTERDAY GHOST
 ‘I saw a ghost yesterday.’ / ‘I have seen a ghost yesterday.’
 (Corpus NGT: CNGT0121, S008)

- (42) EARLIER SEE ALSO EVIDENCE
 ‘Lastly, (I) saw evidence also.’ / ‘Lastly, (I) have seen evidence also.’
 (Corpus NGT: CNGT0428, S021)

Another example of assimilation is the movement of direction of the sign POST, when it appears in the compound POST[^]LAMP, as presented in Figure 12. If the sign POST is articulated by itself, it is specified for a downward movement. However, if it is followed by the sign LAMP, POST is articulated with an upward movement, because LAMP is articulated higher in space (van der Kooij & Crasborn 2016: 270-271).

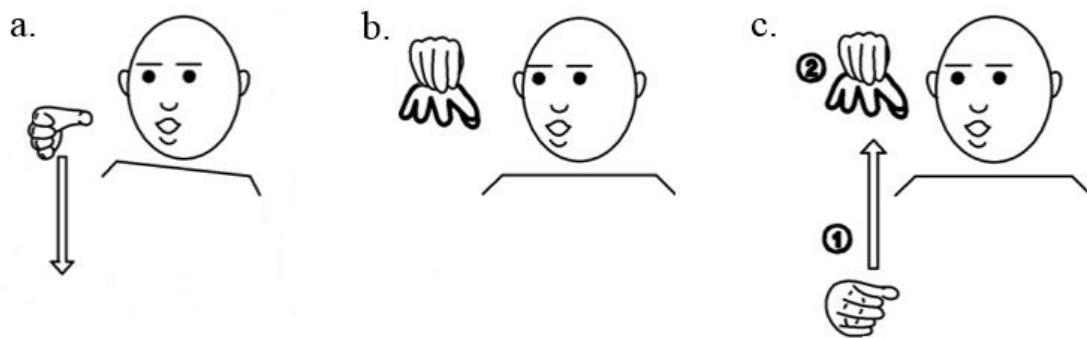


Figure 12: Image (a) shows the citation form of POST in NGT, and image (b) the citation form of LAMP. The compound POST[^]LAMP ('lamppost') is presented in image (c) (van der Kooij & Crasborn 2016: 271).

Schermer et al. (1991) mention that especially in informal signing, more assimilation between signs occurs. For example, decentralisation of the signs, locations on the head are realised lower in space, the size of the movement can be reduced, and two-handed signs are frequently articulated with one hand. The meanings expressed by the morphemes are thus realised differently depending on the context, and therefore NGT is non-transparent with respect to this feature.

5.3 Summary

To summarise, all the examined features and whether they are present (+) or absent (-) in NGT are displayed in Table 1. Eight of the 13 features that were investigated are non-transparent in NGT. Remarkable is that transparent features are only attested within the Morphosyntactic Level.

Table 1: Overview of the presence (+) or absence (-) of the non-transparent features in NGT.

Interpersonal – Representational	
Apposition	+
Cross-reference	+
Interpersonal & Representational – Morphosyntactic	
Discontinuity	+
Grammatical relations	+
Morphophonologically based stem or affix alternation	+
Phonological and morphosyntactic phrasing do not run parallel	+
Morphosyntactic Level	
Grammatical agreement (clausal)	-
Grammatical agreement (phrasal)	-
Grammatical gender assignment	-
Morphologically based stem or affix alternation	+
Nominal expletives	-
Tense copying	-
Phonological Level	
Phonologically based stem or affix alternation	+

6 The place of NGT on the transparency hierarchy

The results for NGT are presented in the previous section. In this section, they will be compared to the results of the languages investigated by Hengeveld & Leufkens (2018) in order to determine whether the place of NGT on the transparency hierarchy that has been postulated for spoken languages can be established. On the basis of this outcome, I will tentatively answer the question whether transparency patterns are modality-specific.

Hengeveld & Leufkens (2018) investigated 30 languages and determined for the same features that I investigated whether the languages are transparent or opaque. In their study, it turned out to be impossible to collect sufficient data for the transparency property relating to the parallelism in morphosyntactic and phonological phrasing. They excluded this feature from their analysis, and for that reason, I will leave this feature out of consideration in what follows, too. The language sample of Hengeveld & Leufkens (2018) is listed in Appendix 1.

6.1 The transparency hierarchy

Hengeveld & Leufkens (2018) arrange their data in a table such that the languages are arranged horizontally from left to right in terms of an increasing degree of transparency. Vertically, the transparency features are arranged in such a way that the likelihood of a transparent manifestation decreases from top to bottom.

In Table 2 below, in which I inserted NGT based on the results in Section 5, firstly, it is shown that French is the least transparent language, and Sri Lanka Malay is the most transparent language in the sample. Secondly, languages are the least likely to adopt nominal expletives and agreement as non-transparent features, whereas languages most likely accept apposition, cross-reference, and phonologically based stem or affix alternation as non-transparent features.

If we zoom in on NGT, horizontally, the language is located in the middle with respect to the degree of transparency of the investigated languages. Vertically, NGT aligns perfectly with the spoken languages in the sense that the likelihood of a transparent manifestation decreases from top to bottom. NGT shows exactly the same pattern as Cupeño, an extinct Uto-Aztecan language, formerly spoken in Southern California.

Table 2: The data of the languages investigated by Hengeveld & Leufkens (2018: 164), with the insertion of NGT indicated in red.

<i>Language</i>																																
<i>Property</i>	French	Egyptian Arabic	Georgian	Basque	Bininj Gun-Wok	Khwarshi	Lango	Sandawe	Sheko	Sochiapan Chinantec	Kayardild	West Greenlandic	Hupa	Ket	Tamil	Cupeño	NGT	Fongbe	Haitian Creole	Huallaga Quechua	Kharia	Kolyma Yukaghir	Turkish	Bantawa	Chukchi	Japanese	Samoan	Tidore	Teiwa	Mapudungun	Sri Lanka Malay	
Nominal expletives	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Grammatical agreement (clausal)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Grammatical gender assignment	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tense copying	+	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Grammatical agreement (phrasal)	+	+	+	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Morphologically based stem or affix alternation	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Discontinuity	+	+	+	+	+	+	+	-	-	-	+	+	+	-	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	+	-	
Morphophonologically based stem or affix alternation	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	na	na	+	+	+	+	+	+	+	+	+	-	-	-	
Grammatical relations	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	
Cross-reference	Na	+	+	+	+	+	+	+	+	+	na	+	+	+	+	+	+	na	na	+	+	+	+	+	+	na	+	+	+	+	+	
Apposition	+	+	+	+	+	+		+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Phonologically based stem or affix alternation	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

Based on the data in Table 2, Hengeveld & Leufkens (2018) derive an implicational hierarchy, displayed below in (46). For some pairs of features, no internal ranking could be established, as indicated by dashed lines in the table. For instance, Egyptian Arabic has grammatical gender assignment but no tense copying, while in Georgian, it is the other way around; Basque does have tense copying but no phrasal grammatical agreement, whereas in e.g. Bininj Gun-Wok, this is the other way around; and West-Greenlandic has phrasal grammatical agreement but no morphologically based stem or affix alternation, while in e.g. Hupa, this is the other way around. Therefore, the features grammatical gender assignment, tense copying, grammatical agreement (phrasal), and morphologically based stem or affix alternation fill one position in the hierarchy. Furthermore, Hengeveld & Leufkens (2018) found five counterexamples to the proposed hierarchy, which all concern the feature discontinuity as is shown in the table. Nevertheless, the hierarchy is well supported by the data. Again, NGT fits perfectly in this transparency hierarchy.

- (46)
1. Grammatical agreement (clausal)/Nominal expletives
 $\supset$
 2. Grammatical gender assignment/Tense copying/
 Grammatical agreement (phrasal)/
 Morphologically based stem or affix alternation
 $\supset$
 3. Discontinuity
 $\supset$
 4. Morphophonologically based stem or affix alternation
 $\supset$
 5. Grammatical relations
 $\supset$
 6. Crossreference/Apposition/
 Phonologically based stem or affix alternation

6.2 *The transparency hierarchy organised by the Levels of FDG*

In Section 5, I discussed the transparency features related to the interface between the levels and within the levels as proposed by FDG. In Table 1, Section 5.3, I already summarised the results for NGT. Hengeveld & Leufkens (2018) rearrange their transparency hierarchy in (46) to Table 3 below in which they take not only the separated features but also the levels into account. What they show is that features operating within the Morphosyntactic Level are the most transparent. This is again also the result for NGT, as already shown in Table 2.

The transparency hierarchy based on levels and interfaces then looks like (47) below. Firstly, languages show most resistance against violations of transparency within the Morphosyntactic Level, and secondly, against violations of transparency at the interface of meaning and form. Finally, languages show the least resistance against violations of transparency at the interface of the two meaning levels and within the Phonological Level.

Table 3: The transparency hierarchy: levels and interfaces (Hengeveld & Leufkens 2018: 166).

Step on transparency hierarchy		Interface or Level
1	Grammatical agreement (clausal)	ML
	Nominal expletives	ML
2	Grammatical gender assignment	ML
	Tense copying	ML
	Grammatical agreement (phrasal)	ML
	Morphologically based stem alternation	ML
3	Discontinuity	IL/RL — ML
4	Morphophonologically based stem alternation	IL/RL/ML — PL
5	Grammatical relations	IL/RL — ML
6	Apposition	IL — RL
	Cross-reference	IL — RL
	Phonological adaptations	PL

$$\begin{array}{c}
 (47) \qquad \qquad \text{ML} \\
 \qquad \qquad \supset \\
 \text{IL/RL/ML} - \text{ML/PL} \\
 \qquad \qquad \supset \\
 \text{IL} - \text{RL, PL}
 \end{array}$$

6.3 *The place of NGT*

Coming back to the question whether the place of NGT on the transparency hierarchy that has been postulated for spoken languages can be established, it appears that NGT behaves on average in terms of its degree of transparency. It is located in the middle of the transparency hierarchy that has been postulated for spoken languages. Furthermore, NGT follows the likelihood of transparent manifestations determined for spoken languages perfectly.

As for the question whether transparency patterns are modality-specific, purely based on the outcome of this investigation of a single sign language, I can tentatively answer that they are not. NGT is located in the middle of the degree

of transparency that has been determined for spoken languages and follows the same pattern concerning the features that are most likely transparent and those that are most likely opaque.

7 Discussion

In the introduction, it was mentioned that signed languages are frequently assumed to be more transparent than spoken languages. The reasons for this are that they exist in the visual-spatial modality rather than the auditory-oral modality, and that they are relatively young. As the results indicate, this is not the case for NGT. A comparison of NGT with spoken languages reveals that there are various spoken languages that are more transparent than NGT. Furthermore, I mentioned that transparency is often confused with iconicity. It is worth mentioning again that a clear distinction has to be made between these two concepts. Although NGT exhibits probably more iconic aspects than many spoken languages, it is shown that NGT is at the same time less transparent than many spoken languages.

Although NGT realises non-transparent and transparent relations differently from spoken languages, for instance, by using space or by expressing manual and non-manual markers simultaneously, no modality-specific transparency patterns were found. However, on the basis of this research on a single sign language, no firm conclusions can be drawn. For that reason, it is interesting and important to investigate transparency in more sign languages within the framework of FDG.

8 Conclusion

In this first study on transparency in sign languages within the framework of FDG, I examined NGT. The aims of this research were, firstly, to establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages, and secondly, to tentatively answer the question whether transparency patterns are modality-specific.

By means of consulting existing research on NGT and by making extensive use of the Corpus NGT, I investigated two features that operate at the interface of the Interpersonal and Representational Level, four features that operate at the interface of the Interpersonal, Representational and Morphosyntactic Level, six features that operate within the Morphosyntactic Level, and one feature that operates within the Phonological Level. As for the 13 investigated features, it turns out that NGT exhibits transparent relations only within the Morphosyntactic Level. NGT does not have nominal expletives, no

grammatical gender assignment, no tense copying, and does not exhibit grammatical agreement, both clausal and phrasal. The only opaque feature within this level appears to be morphologically based stem or affix alternation.

As for the other levels, NGT shows non-transparent features at the interface of the Interpersonal and Representational Level, namely apposition and cross-reference. Furthermore, discontinuity, grammatical relations, morphophonologically based stem or affix alternations, and non-parallelism between phonological and morphosyntactic phrasing are present, which are all features operating at the interface of the Interpersonal, Representational and the Morphosyntactic Level. Moreover, within the Phonological Level, phonologically based stem or affix alternation is present, which is considered opaque as well.

To establish the place of NGT on the transparency hierarchy that has been postulated for spoken languages, the results were compared to 30 spoken languages. It turned out that NGT behaves on average regarding the degree of transparency. The place of NGT is established in the middle of the transparency hierarchy. Moreover, NGT follows the likelihood of transparent manifestations determined for spoken languages perfectly.

Based on these results for NGT only, we conclude that transparency patterns are not modality-specific. However, this answer is tentative, because this cannot be claimed based on only one particular sign language, and further research on transparency in other sign languages is necessary.

References

- Bos, H. 1991. Ruimtegebruik. In T. Schermer, C. Fortgens, R. Harder & E. de Nobel (eds.), *De Nederlandse Gebarentaal*. Deventer: Van Tricht Uitgeverij, 145–179.
- Bos, H. 1993. Agreement and prodrop in Sign Language of the Netherlands. In K. Hengeveld & F. Drijkoningen (eds.), *Linguistics in the Netherlands*. Amsterdam: John Benjamins, 37–47.
- Bos, H. 1994. An auxiliary verb in Sign Language of the Netherlands. In I. Ahlgren, B. Bergman & M. Brennan (eds.), *Perspectives on Sign Language Structure*. Durham: ISLA, 37–53.
- Bos, H. 1998. An analysis of main verb agreement and auxiliary agreement in SLN from the perspective of the theory of Conceptual Semantics. Paper presented at the *Sixth International Conference on Theoretical Issues in Sign Language Research*, Gallaudet University, Washington DC, November 1998.
- Bowern, C.L. 2012. *A Grammar of Bardi*. Berlin: De Gruyter Mouton.
- Brentari, D. 2012. Phonology. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 21–54.

- Brunelli, M. 2011. *Antisymmetry and Sign Languages: A Comparison between NGT and LIS*. PhD dissertation, University of Amsterdam. Utrecht: LOT.
- Comrie, B. 1986. Tense in indirect speech. *Folia Linguistica* 20, 265–296.
- Cormier, K., S. Smith & M. Zwets. 2013. Framing constructed action in British Sign Language narratives. *Journal of Pragmatics* 55: 119–139.
- Crasborn, O. 2001. *Phonetic Implementation of Phonological Categories in Sign Language of the Netherlands*. PhD dissertation, University of Leiden. Utrecht: LOT
- Crasborn, O. 2012. Phonetics. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 4–20.
- Crasborn, O. & E. van der Kooij. 2016. Phonetics. In A. Baker, B. van den Bogaerde, R. Pfau & T. Schermer (eds.), *The Linguistics of Sign Languages: An Introduction*. Amsterdam: John Benjamins, 229–250.
- Crasborn, O. & I. Zwitterlood. 2008. The Corpus NGT: an online corpus for professionals and laymen. In O. Crasborn, T. Hanke, E. Efthimiou, I. Zwitterlood & E. Thoutenhoofd (eds.), *Construction and Exploitation of Sign Language Corpora. 3rd Workshop on the Representation and Processing of Sign Languages*. ELDA: Paris, 44–49.
- Crasborn, O., I. Zwitterlood & J. Ros. 2008. *Corpus NGT. An Open Access Digital Corpus of Movies with Annotations of Sign Language of the Netherlands*. Centre for Language Studies, Radboud University Nijmegen. URL: <http://hdl.handle.net/hdl:1839/00-0000-0000-0004-DF8E-6>.
- Donohue, M. 2008. Semantic alignments systems: what's what, and what's not. In M. Donohue & S. Wichmann (eds.), *The Typology of Semantic Alignment*. Oxford: Oxford University Press, 24–75.
- Evans, N. 2003. *Bininj Gun-Wok: A Pan-dialectal Grammar of Mayali, Kunwinjku and Kune*. Canberra: Pacific Linguistics.
- Fischer, S.D. 2000. *Thumbs up versus Giving the Finger: Indexical Classifiers in NS and ASL*. Paper presented at the 7th International Conference on Theoretical Issues in Sign Language Research, Amsterdam, July 26th 2000.
- Fortgens, C. 1991. Geschiedenis: gebarentaal en dovenonderwijs. In T. Schermer, C. Fortgens, R. Harder & E. de Nobel (eds.), *De Nederlandse Gebarentaal*. Deventer: Van Tricht Uitgeverij, 195–224.
- Friedman, L.A. 1975. Space, time, and person reference in American Sign Language. *Language* 51: 940–961.
- Gebarencentrum. 2017. Online Dictionary of Sign Language of the Netherlands. <https://www.gebarencentrum.nl>.
- Gijn, I. van. 2004. *The Quest for Syntactic Dependency: Sentential Complementation in Sign Language of the Netherlands*. PhD dissertation, University of Amsterdam. Utrecht: LOT.
- Hannay, M. & E. Keizer. 2005. A discourse-treatment of non-restrictive apposition in an FDG of English. In M.Á. Gómez-González & J.L. Mackenzie (eds.), *Studies in Functional Discourse Grammar*. Bern: Peter Lang, 159–194.

- Harder, R., C. Koolhof & T. Schermer. *Meervoud in de NGT: Verslag van een Onderzoek in het Kader van OCW Subsidie 2003*. Nederlands Gebarent centrum.
- Hengeveld, K. 2007. Parts-of-speech systems and morphological types. *ACLC Working Papers* 2(1): 31–48.
- Hengeveld, K. 2011. Transparency in Functional Discourse Grammar. *Linguistics in Amsterdam* 4(2): 1–21.
- Hengeveld, K. & S. Leufkens. 2018. Transparent and non-transparent languages. *Folia Linguistica* 52(1): 139–175.
- Hengeveld, K. & J.L. Mackenzie. 2008. *Functional Discourse Grammar: A Typologically-based Theory of Language Structure*. Oxford: Oxford University Press.
- Keizer, E. 2015. *A Functional Discourse Grammar for English*. Oxford: Oxford University Press.
- Kimmelman, V. 2014. *Information Structure in Russian Sign Language and Sign Language of the Netherlands*. PhD dissertation, University of Amsterdam.
- Kimmelman, V. 2015. Topics and topic prominence in two sign languages. *Journal of Pragmatics* 87: 156–170.
- Klima, E.S. & U. Bellugi. 1979. *The Signs of Language*. Cambridge: Harvard University Press.
- Kornfilt, J. 1997. *Turkish*. London: Routledge.
- Leeson, L. & J. Saeed. 2012. Word order. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 245–265.
- Lefebvre, C. & A. Brousseau. 2002. *A Grammar of Fongbe*. Berlin: De Gruyter Mouton.
- Legeland, I. 2016. *Agree or not? Congruentie in de Nederlandse Gebarentaal: Een Corpus-gebaseerd Onderzoek*. Unpublished Bachelor thesis, University of Amsterdam.
- Leufkens, S. 2015. *Transparency in Language: A Typological Study*. PhD dissertation, University of Amsterdam. Utrecht: LOT.
- Lewis, G. 1967. *Turkish Grammar*. Oxford: Clarendon Press.
- Lieber, R. 2009. *Introducing Morphology*. Cambridge: Cambridge University Press.
- Mathur, G. & C. Rathmann. 2012. Verb agreement. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 136–157.
- Meir, I. 1998. Syntactic-semantic interaction in Israeli Sign Language verbs: The case of backwards verbs. *Sign Language & Linguistics* 1(1): 3–37.
- Meir, I. 2002. Cross-modality perspective on verb agreement. *Natural Language and Linguistic Theory* 20: 413–450.
- Meir, I. 2012. Word classes and word formation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 77–111.
- Montrul, S., R. Foote & S. Perpiñán. 2008. Gender agreement in adult second language learners and Spanish heritage speakers: The effects of age and context of acquisition. *Language Learning* 58(3): 503–553.
- Nichols, J. 2006. A case of rare fluid intransitivity in Europe: Russian. *Annual Meeting of the Linguistics in Amsterdam* 11,2 (2018)

- Berkeley Linguistics Society* 32(1): 263–274.
- Nijen Twilhaar, J. 2009. *Lexicon van de Gebarentaalwetenschap*. Deventer: Van Tricht Uitgeverij.
- Oomen, M. & R. Pfau. 2017. Signing NOT (or not): A typological perspective on standard negation in Sign Language of the Netherlands. *Linguistic Typology* 21(1): 1–51.
- Padden, C. 1988. *Interaction of Morphology and Syntax in American Sign Language*. New York: Garland.
- Perniss, P., R. Pfau & M. Steinbach. 2007. Can't you see the difference? Sources of variation in sign language structure. In P. Perniss, R. Pfau & M. Steinbach (eds.), *Visible Variation: Comparative Studies on Sign Language Structure*. Berlin: De Gruyter Mouton, 1–34.
- Perniss, P., R.L. Thompson & G. Vigliocco. 2010. Iconicity as a general property of language; evidence from spoken and signed languages. *Frontiers in Psychology* 1(227): 1–15.
- Pfau R. & H. Bos. 2016. Syntax: simple sentences. In A. Baker, B. van den Bogaerde, R. Pfau & T. Schermer (eds.), *The Linguistics of Sign Languages: An Introduction*. Amsterdam: John Benjamins, 117–148.
- Pfau, R. & J. Quer. 2010. Nonmanuals: their prosodic and grammatical roles. In D. Brentari (ed.), *Sign Languages (Cambridge Language Surveys)*. Cambridge: Cambridge University Press, 381–402.
- Pizzuto, E. & V. Volterra. 2000. Iconicity and transparency in sign languages: A cross-linguistic cross-cultural view. In K. Emmorey & H. Lane (eds.), *The Signs of Language Revisited: An Anthology to Honor Ursula Bellugi and Edward Klima*. Mahwah: Lawrence Erlbaum, 261–286.
- Rietveld-van Wingerden, M. 2003. Educating the deaf in the Netherlands: a methodological controversy in historical perspective. *History of Education* 32(4): 401–416. DOI: 10.1080/00467600304146
- Rietveld-van Wingerden, M. & C. Tijsseling. 2010. *Ontplooiing door Communicatie: Geschiedenis van het Onderwijs aan Doven en Slechthorenden in Nederland*. Antwerpen: Garant Uitgevers.
- Ross, J.R. 1967. *Constraints on Variables in Syntax*. PhD dissertation, MIT, Cambridge [Published 1986 as *Infinite Syntax*, Norwood: Ablex]
- Schermer, T. 1991a. Classifiers. In T. Schermer, C. Fortgens, R. Harder & E. de Nobel (eds.), *De Nederlandse Gebarentaal*. Deventer: Van Tricht Uitgeverij, 124–129.
- Schermer, T. 1991b. Tijd. In T. Schermer, C. Fortgens, R. Harder & E. de Nobel (eds.), *De Nederlandse Gebarentaal*. Deventer: Van Tricht Uitgeverij, 132–137.
- Schermer, T., C. Fortgens, R. Harder & E. de Nobel (eds.). 1991. *De Nederlandse Gebarentaal*. Deventer: Van Tricht Uitgeverij.
- Shepard-Kegl, J. 1985. *Locative Relations in American Sign Language: Word Formation, Syntax, and Discourse*. PhD dissertation, Massachusetts Institute of Technology.
- Smith, W.H. 1989. *The Morphological Characteristics of Verbs in Taiwan Sign Language*. PhD dissertation, Indiana University.

- Steinbach, M. & R. Pfau. 2007. Grammaticalization of auxiliaries in sign languages. In P. Perniss, R. Pfau & M. Steinbach (eds.), *Visible Variation: Comparative Studies on Sign Language Structure*. Berlin: De Gruyter Mouton, 303–339.
- Stokoe, W.C. 1960. Sign language structure. An outline of the visual communication system of the American deaf. *Studies in Linguistics Occasional Papers* 8. Buffalo: University of Buffalo Press [Re-issued 2005, *Journal of Deaf Studies and Deaf Education* 10: 3–37].
- Taub, S.F. 2001. *Language from the Body: Iconicity and Conceptual Metaphor in American Sign Language*. Cambridge: Cambridge University Press.
- Taub, S.F. 2012. Iconicity and metaphors. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language: An International Handbook*. Berlin: De Gruyter Mouton, 388–411.
- Velasco, D.G. 2013. Raising in Functional Discourse Grammar. In J.L. Mackenzie & H. Olbertz (eds.), *Casebook in Functional Discourse Grammar*. Amsterdam: John Benjamins, 249–276.
- Velde, F. van de. 2012. PP extraction and extraposition in Functional Discourse Grammar. *Language Sciences* 34(4): 433–454.
- Zeshan, U. 2004. Hand, head, and face: Negative constructions in sign languages. *Linguistic Typology* 8: 1–58.
- Zwitserlood, I. 2003. *Classifying Hand Configurations in NGT*. PhD Dissertation, University of Utrecht.
- Zwitserlood, I. 2012. Classifiers. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign Language: An International Handbook*. Berlin: De Gruyter Mouton, 158–186.
- Zwitserlood, I. & I. van Gijn. 2006. Agreement phenomena in Sign Language of the Netherlands. In P. Ackema, P. Brandt, M. Schoorlemmer & F.P. Weerman (eds.), *Arguments and Agreement*. Oxford: Oxford University Press, 195–229.

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Appendix 1: The language sample investigated by Hengeveld & Leufkens (2018).

Table 4: The language sample investigated by Hengeveld & Leufkens (2018: 160-161).

<i>Language family (Lewis et al. 2013)</i>	<i>Sample Language(s)</i>	<i>Grammatical descriptions used</i>	<i>Specialists consulted</i>
Afro-Asiatic	<i>Arabic, Egyptian</i>	Gary and Gamal-Eldin (1981)	Leston Buell, Mona Hegazy, Caroline Roset, Manfred Woidich
Sino-Tibetan	<i>Bantawa</i>	Doornenbal (2009)	Marius Doornenbal
Basque	<i>Basque</i>	Hualde and De Urbina (2003)	
Gunwingguan	<i>Bininj Gun-Wok</i>	Evans (2003)	Nicholas Evans
Chukotko-Kamchatkan	<i>Chukchi</i>	Dunn (1999)	Michael Dunn
Uto-Aztecan	<i>Cupeño</i>	Hill (2005)	
Niger-Congo	<i>Fongbe</i>	Lefebvre and Brousseau (2002)	Enoch Aboh
Indo-European	<i>French</i>	---	Léonie Blanc
Kartvelian	<i>Georgian</i>	Hewitt (1995)	George Hewitt, Thomas Wier
Pidgins & Creoles	<i>Haitian Creole</i>	Lefebvre <i>et al.</i> (1982), DeGraff (2007), Glaude (2012)	
Quechuan	<i>Huallaga Quechua</i>	Weber (1989), Grández Ávila (2011)	
Eyak-Athabaskan	<i>Hupa</i>	Golla (1960, 1985, 1996)	
Japonic	<i>Japanese</i>	Hinds (1986)	Shoichi Iwasaki
Pama-Nyungan	<i>Kayardild</i>	Evans (1995)	Nicholas Evans
Yeniseian	<i>Ket</i>	Werner (1997), Georg (2007)	Edvard Vajda
Austro-Asiatic	<i>Kharia</i>	Leufkens (2011), Peterson (2011)	John Peterson
North Caucasian	<i>Khwarshi</i>	Khalilova (2009)	Zaira Khalilova
Yukaghir	<i>Kolyma Yukaghir</i>	Maslova (2003)	Elena Maslova
Nilo-Saharan	<i>Lango</i>	Noonan (1992)	
Mapudungu	<i>Mapudungun</i>	Zúñiga (2006), Smeets (2008)	Fernando Zúñiga
Austronesian	<i>Samoan</i>	Mosel and Hovdhaugen (1992)	
Khoisan	<i>Sandawe</i>	Eaton (2010), Steeman (2012)	Helen Eaton
Afro-Asiatic	<i>Sheko</i>	Aklilu (1988), Hellenthal (2010)	Anneke Hellenthal
Otomanguean	<i>Sochiapan Chinantec</i>	Foris (2000)	David Foris
Pidgins & Creoles	<i>Sri Lanka Malay</i>	Nordhoff (2009, 2011)	Sebastian Nordhoff
Dravidian	<i>Tamil</i>	Andronov (2004), Asher (1982), Lehmann (1989), Schiffman (1999)	Mohammed Jafar, Sebastian Nordhoff, Ian Smith, Sandhya Sundaresan
Trans-New Guinea	<i>Teiwa</i>	Klamer (2003)	Marian Klamer
West Papuan	<i>Tidore</i>	Van Staden (2000)	Miriam van Staden
Altaic	<i>Turkish</i>	Kornfilt (1997), Lewis (1978)	Barış Kabak
Eskimo-Aleut	<i>West Greenlandic</i>	Fortescue (1984), Sadock (2003)	Michael Fortescue

Appendix 2: Glossing conventions

The principle of glossing used in this study is that only the information that is crucial for the interpretation of examples is provided. This means that, for instance, non-manuals that are not relevant to the illustrated phenomenon are not marked or glossed. SMALL.CAPS are used for the translation of signs.

General glosses

I, II, III	semantic noun classes
1	first person
2	second person
3	third person
CAUS	causative
COMM	common gender
COMP	complementiser
DO	direct object
ERG	ergative
F	feminine
M	masculine
MIN	minimal
NEG	native
NEUT	neuter gender
PASS	passive
PL	plural
PRS	present tense
PST	past tense
REFL	reflexive
REM.PST	remote past
SG	singular
S.actor	subject actor
S.undergoer	subject undergoer
TR	transitive

Sign language glosses

Lines above the gloss indicate the extension of a specific non-manual marker; this is also referred to as the scope of a non-manual marker.

Manual

1, 2, 3a, 3b	first, second, third person markers
AUX-OP	auxiliary
CL:	classifier predicate
INDEX	pointing sign

Non-manual

hs	headshake
neg	negation marker
top	topic marker