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Analyzing the ZELF and other reflexive constructions in Sign Language of the Netherlands from a Functional Discourse Grammar perspective: a corpus-based typological and theoretical study

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0. Abstract

This paper presents the first corpus-based study of reflexivity in Sign Language of the Netherlands (henceforth, NGT) and the first study of reflexivity in a sign language from a Functional Discourse Grammar perspective. Importantly, seven reflexive constructions were identified in NGT: i) ZELF constructions with a pronominal pointing sign, ii) ZELF constructions without a pronominal sign, iii) constructions with a reflexivized agreeing verb, iv) constructions with a reflexivized agreeing verb and a pronominal pointing sign, v) EIGEN constructions, vi) constructions with a pronominal pointing sign and vii) constructions with object omission. I argue that the first five constitute specialized reflexive constructions and show that the Functional Discourse Grammar model can successfully account for reflexivity in sign languages and that NGT possesses all three types of reflexive constructions proposed by the model: two-place reflexives, one-place reflexives, and mixed reflexives. Furthermore, two non-reflexive uses of ZELF were found: the possessive use and the anticausative use. I conclude by locating the NGT data within the landscape of reflexivity in both signed and spoken languages, commenting on the cognitive saliency of reflexivity and event participant structure, and raising questions for future research. The data for this study comes from Corpus NGT.

Keywords: Sign Language of the Netherlands (NGT), reflexives, typology, Functional Discourse Grammar, pragmatics-semantics-syntax interfaces, sign language linguistics

1. Introduction

The relation between an event and its participants is a crucial component of event narration, an activity in which humans engage on a daily basis. In natural languages, despite some exceptions, this relation is expressed through the relation between verbs, which typically denote events, and their arguments, which denote the participants of a given event. (Rissman, Rawlins & Landau 2015). Studies on language acquisition have shown that sensitivity to event participant structure is present from the earliest stages of language acquisition (Pinker 2013, Pace et al. 2016). Furthermore, sensitivity to participant structure has been attested in non-fully fledged linguistic systems, such as homesign (Goldin-Meadow et al. 2009), suggesting that participant structure is fundamental to human language.

Crucially, languages seem to be sensitive to whether or not the participants of an event are distinct, often possessing special strategies to mark instances in which two participants are not distinct. These strategies are called reflexive constructions.[1] In these constructions, the arguments of a (di)transitive verb or predicate are co-referent, simultaneously fulfilling the role of the agent and the undergoer. Example (1a) illustrates the canonical strategy used to mark reflexivity in English, namely through a reflexive pronoun. Example (1b), on the other hand, illustrates a non-reflexive construction containing the same transitive verb *to like* and the arguments *I* and *chocolate*.

(1) *English*

a. I_i like **myself**$_i$.

[1] Other constructions with co-reference include reciprocal constructions, which must involve at least two different participants who simultaneously take the role of agent and patient in relation to each other and in which the same event takes place at least twice. Reciprocal constructions have a close relationship with reflexive constructions and it is often the case that both types of construction are not formally differentiated cross-linguistically (cf. Portuguese, *Eles viram-**se** ao espelho* ('They saw **themselves** in the mirror' and 'They saw **each other** in the mirror') where the polysemic clitic *se* legitimizes both a reflexive and a reciprocate reading. However, whereas reflexive constructions encode single events whose participants are not distinct and simultaneously fulfill the roles of agent and undergoer, reciprocal constructions encode a plurality of events whose participants are distinct and simultaneously occupy both roles (Giomi 2021).

b. I like chocolate.

Note that, like most languages, English has several reflexivization strategies. For instance, reflexivity may be encoded with the prefix *-self* as in (2) or through argument omission, typically in the case of lexically reflexive verbs[2], as in (3). However, the marking of reflexivity through a reflexive pronoun is the only productive reflexivization strategy in English (Faltz 2016/1977, Giomi 2021).

(2) *English*
The defendant's statements seemed to **self**-contradict.

(3) *English*
I shaved **Ø**.

Faltz's (2016/1977) seminal work on reflexive constructions in spoken languages identified two main morphosyntactic strategies for the marking of reflexivity: i) reflexivity marking on the verb, as illustrated in (2) above, where reflexivity is marked on the verb with a prefix*,* and reflexivity marking on the argument, as in (1a), where reflexivity is marked with a specialized reflexive pronoun.

Though reflexivity has been more extensively researched in spoken languages, similar observations have been made for sign languages, raising questions about modality-independent[3] aspects (see section 2.2). However, Faltz's (2016/1977) morphosyntactic typology of reflexivity fails to account for languages with mixed reflexivization strategies, that is in which reflexivity is simultaneously encoded on the verb and on the argument (see section 2.1).

Reflexivity has also been studied through formal approaches such as Binding Theory (Chomsky 1981, Büring 2005), which analyzes the relationship between pronouns or anaphoras and their antecedents within a sentence and aims to determine the rules and constraints responsible for the distribution and interpretation of those expressions. Importantly, the term 'Binding' refers to the phenomenon in which the interpretation of a pronoun or anaphora is dependent on the interpretation of the antecedent (usually a noun phrase) within the sentence (Chomsky 1981, Büring 2005). In this study, however, we will follow Giomi's (2021) functional model of reflexives, in which the author analyzes the semantic and pragmatic properties of reflexive constructions in spoken languages and proposes a tripartite typology of reflexives from a Functional Discourse Grammar (Hengeveld & Mackenzie 2008) perspective.

Though extensive research on reflexivity in spoken languages has been conducted, studies on reflexive constructions in sign languages remain scarce (cf. Kimmelman (2009) on Russian Sign Language (RSL) and NGT and Kayabaşı & Abner (2022) on Turkish Sign Language (TİD)). Studying reflexivity in sign languages is of the utmost importance when it comes to drawing conclusions about this phenomenon in human language. In this paper, I therefore aim to add to Giomi's typology data from a sign language, namely NGT. A second aim is to expand Kimmelman's (2009) study on reflexives

[2] The term *grooming* verb or lexically reflexive verb refers to those verbs which denote actions that are typically expected to be done to oneself. In languages such as English, the explicit marking of reflexivity in constructions involving such verbs is considered redundant. Contrastingly, in Dutch, constructions involving such verbs are typically marked for reflexivity with a reflexive pronoun (cf. English *Jan got dressed* vs. Dutch *Jan heft **zich** aangekleed* 'Jan got dressed', Faltz 2016/1977: 274).

[3] Spoken and sign languages operate on different modalities: while spoken languages are based on sound, therefore belonging to the auditive-aural modality, sign languages are based on the use of space and vision and thus belong to the visual-spatial modality. This contrast produces differences in the way information is expressed and processed in both modalities and the available strategies for the expression of syntactic categories.

in NGT, by analyzing corpus data from Corpus NGT (Crasborn et al. 2008). More specifically, I aim to first identify and describe the strategies used for the marking of reflexivity in NGT and, secondly, to formalize them applying the Functional Discourse Grammar model.

In the following sections, I first provide background on previous studies on reflexive constructions in spoken and sign languages and on Functional Discourse Grammar's typology of reflexivity (sections 2 and 3). I then present the research questions and the methodology (section 4). Section 5 will be dedicated to the results of the data analysis and section 6 to the discussion of the results and the formalization of the reflexive constructions identified in NGT with the FDG framework. Finally, section 7 will conclude the paper.

2. Reflexivity across modalities

In this section, I will summarize previous studies on reflexivity in spoken and sign languages, as well as provide some background on key concepts relevant for the study of reflexivity in the visual-spatial modality.

2.1 Reflexivity in spoken languages

A vast body of literature on reflexive constructions in spoken languages has shown reflexivity to be present in languages from several linguistic families (Chomsky 1981, Abraham et al. 1983, Gaby 2008, Moyse-Faurie 2008, Faltz 2016/1977, Giomi 2021), proving it to be an important concept in human language. Before introducing the main strategies employed to encode reflexivity, however, a first distinction between lexical and grammatical reflexivity should be made. As mentioned earlier, lexical reflexivity refers to cases in which the semantic meaning of a transitive predicate is inherently reflexive, that is, cases in which the action or event denoted by the predicate is expected to be applied to oneself. Such predicates are also commonly referred to as *grooming* predicates since they often denote actions such as *washing*, *bathing* or *shaving*. Generally speaking, reflexivity is not explicitly marked via grammatical strategies in constructions involving inherently reflexive predicates such as the one in (4a), whose default interpretation is reflexive. However, these predicates may also occur in two-place predications (4b) and are compatible with the redundant use of grammatical markers of reflexivity (4c).

(4) *English*
   a. Linda bathed [herself].
   b. Linda bathed her cat.
   c. Linda bathed herself.

Grammatical reflexivity, on the other hand, refers to cases in which the meaning of a predicate is not inherently reflexive, and the reflexivity of the action or event being denoted is explicitly encoded, that is, cases in which reflexivity is marked through specialized reflexive constructions. As previously mentioned, Faltz's (2016/1977) seminal work on such constructions identified two main strategies for the marking of reflexivity across spoken languages: grammatical reflexivity may be marked on the predicate, through affixes or clitics, among others, or on the argument, via, for instance, free reflexive pronouns or nouns. Example (5)[4] illustrates reflexive verb marking with the clitic *se* in French, while example (6) provides an instance of argument marking in Papiá Kristang, a Portuguese-based creole spoken in Malaysia, where the noun *korpu* is used to convey reflexivity:

(5) *French*

[4] The example is my own.

Max **s**'habille.
Max REFL-dress.3SG
'Max is getting dressed.'

(6) *Papiá Kristang* (Baxter & de Silva 2004: 67)
Eli ja matá **korpu.**
3SG PFV kill body
'He killed himself.'

Another possible way to mark reflexivity consists in omitting or dropping the object of a transitive verb, referred to as *implicit construction* by Haspelmath & the APiCS Consortium (2013). These constructions are characterized by the fact that they are compatible with grooming and non-grooming verbs and that the only possible interpretation they yield is a reflexive one, and should, therefore, not be confused with the type of construction exemplified in (4a) above, which applies only to grooming verbs. Example (7) provides an illustration of this construction in Santome, a Portuguese based creole spoken in S. Tomé e Príncipe:

(7) *Santome* (Ferraz 1979: 72)
N ga ba kenta.
1SG IMP go warm
'I am going to warm myself.'

It should furthermore be noted, however, that languages often exhibit constructions comprising features characteristic of the aforementioned verb and argument marking strategies, as in Kuuk Thaayorre (8), a Paman language spoken in Queensland, Australia, where reflexivity is marked with the reflexive pronoun *nhangkanunt* and the verbal affix *e*, or in Hmwaveke (9), a Kanak language spoken in New Caledonia, where both the reflexive prefix *ve* and the plain pronoun *yong* are used to signal co-reference between the agent and the undergoer.

(8) *Kuuk Thaayorre* (Gaby 2008 : 264)
Nhangkanunt kar nhaath-**e**-ø.
2.SG.REFL like look-REFL-IMP
You should look at yourself.

(9) *Hmwaveke* (Moyse-Faurie 2008: 123)
Yo **ve**-ibi **yong**.
1.SG REFL-pinch 1.SG
I am pinching myself.

Due to the existence of such constructions, the boundary between verbal and argument marking is not always clearcut, making it difficult to classify certain strategies according to their morphosyntactic features. Giomi (2021) thus proposes a typology of reflexive constructions based on pragmatic and semantic features, which will be presented in section 3. Before discussing this typology, however, let us briefly present the Dutch system of reflexives and the existing literature on reflexivity in sign languages.

Because sign languages often borrow from the surrounding spoken language due to heavy contact, it is important to introduce the way reflexivity is encoded in Dutch, the spoken language that surrounds NGT, as some of the reflexive constructions found in NGT could have been influenced by the Dutch system of reflexives. Like English, the most productive reflexive construction in Dutch is an

argument marking construction involving the pronoun *zichzelf*, which agrees in person and number with the subject (Reinhart & Reuland 1993), as illustrated in (10a,b,c)[5]:

(10) *Dutch*

a. Hij ziet **zichzelf** in de spiegel.
3SG.MASC.NOM see.3SG REFL.3SG in the mirror
'He sees himself in the mirror.'

b. Ik zie **mezelf/mijzelf** in de spiegel.
1SG.NOM see.1SG REFL.1SG in the mirror
'I see myself in the mirror.'

c. Ze zien **zichzelf** in de spiegel.
3PL.NOM see.3PL REFL.3PL in the mirror
'They see themselves in the mirror.'

Another, less productive strategy is to use the reflexive pronoun *zich*, much in the same fashion as *zichzelf*. The former is, however, mostly used with inherently reflexive verbs such as *wassen* ('to wash'), in (11)[6]:

(11) *Dutch*

Hij waste **zich** grondig voordat hij
3SG.MASC.NOM wash.3SG.PST REFL thoroughly before 3SG.MAS.NOM
naar het feest ging.
to the party go.3SG.PST
'He washed thoroughly before going to the party.'

Lastly, Dutch has the emphatic pronoun *zelf*, which is, not surprisingly, diachronically related to *zichzelf* (de Clerck & van der Kooij 2005), as the grammaticalization pathway from emphatic pronoun to reflexive pronoun is frequently attested cross-linguistically and observable in English and NGT, where *-self* pronouns and ZELF can be used for both purposes.

2.2 Reflexivity in sign languages

Given that sign language linguistics is a relatively young research field, as compared to the study of spoken languages, fewer studies on reflexive constructions in sign languages exist than on spoken languages. Nonetheless, the existing literature on reflexivity in sign languages shows that languages from both the visual-spatial and the auditive-oral modality employ similar strategies to encode reflexivity (Faltz 2016/1977, Kimmelman 2009, Giomi 2021, Kayabaşı & Abner 2022), thus reinforcing the now generally held assumption that sign languages are as rich and complex as spoken languages. In this section, we will first provide some background on the use of space and pronominal systems as well as verb agreement in sign languages. We will then review previous work on reflexivity in sign languages.

2.2.1 Pronouns, verbal agreement, and the use of space

[5] The examples are my own.
[6] The example is my own.

One of the aspects that sets sign languages apart from spoken languages is the modality-specific use of space to express referentiality. The unique use of space in this regard is evident in the pronominal systems found across sign languages as well as in the way verbal agreement is encoded.

More specifically, space is often combined with pointing signs in sign languages to associate a referent with a location or *locus* in the signing space, which, depending on whether the referent is present or not in the context of discourse, may be abstract or concrete. Typically, a noun is combined with a pointing sign which locates it in the signing space as in Israeli Sign Language (ISL) in (12a), where ADAM is associated to location 3a. This location can then be used to refer to the referent again with a pointing sign, which, in that case, functions as a personal pronoun, as is the case with IX3a in (12b). Notice how in (12a) a different location, 3b, is assigned to a distinct referent, ELAINE.

(12) *ISL* (Baker & Pfau 2016: 106)

a. ADAM IX3a ELAINE IX3b TOGETHER-GO MOVIES.
'Adam and Elaine went to the movies together.'

b. IX3a BUY TICKET.
'He bought the tickets.'

Furthermore, pointing signs are typically used to encode first, second and third person in sign languages, thus functioning as pronouns, though no formal distinction is usually made between first and non-first person (Meier 1990).

Another way in which space is used for reference is in the context of verbal agreement. Agreement can be characterized as the sharing of a feature such as person, number, or gender between two or more units. Several sign languages display verbal subject and object agreement. This is usually achieved by first assigning non-present referents with a *locus* in the signing space as with ADAM and ELAINE in (12a), or referring to present referents such as a speaker and its addressee(s) by means of pointing signs targeting each one of them. After this, abstract (13a) or concrete (13b) referents can then be cross-referenced on the verb, by modulating either the verb's orientation and/or movement:

(13) *NGT* (Pfau 2016: 2011)

a. TEACHER IX3a STUDENT IX3b 3aCALL3b.
'The teacher calls the student.'

b. IX2 IX1 WANT BOOK 2GIVE1.
'You want to give me a book.'

In (13a) the non-present referents TEACHER and STUDENT are first assigned to the *loci* 3a and 3b, respectively, which are then used to mark verbal subject and object agreement through a change in the orientation of the verb CALL. In (13b) IX2 is associated with the addressee while IX1 is associated with the speaker and the verb GIVE undergoes a change in movement to express agreement with the subject and the object.

Note, however, that not every verb can be marked for agreement. Those are called *non-agreeing verbs* or *plain verbs* and are usually body-anchored and thus cannot modify their orientation and/or movement to encode agreement.

2.2.2 Reflexive constructions in sign languages

Sign languages seem to pattern closely with spoken languages when it comes to encoding reflexivity, except for the modality-specific use of space for this purpose. For instance, sign languages have been reported to employ the two main morphosyntactic strategies identified by Faltz (2016/1977) for the marking of reflexivity in spoken languages (Kimmelman 2009, Kayabaşı & Abner 2022). We see in (14) and (15) two distinct examples of argument marking: in American Sign Language (ASL) (14), co-referentiality between the two arguments of LIKE is marked with the reflexive pronoun SELF which inflects for person by means of spatial modification, as indicated by the subscript *a*; in TİD (15), on the other hand, reflexivity is encoded with the body-anchored reflexive pronoun KENDİ whose form is fixed and may not undergo spatial modification to agree with the subject.

(14) *ASL* (Lillo-Martin 1995: 166)
J-O-S-E LIKE SELF3a.
'Jose likes himself.'

(15) *TİD* (Dikyuva et al 2017: 205)
YOU KENDİ READ IMPROVE EXIST.
'You improve yourself by reading (studying).'

(16) *RSL* (Kimmelman 2009: 17)
IX1 LOOK1.
'I looked at myself.'

The predicate marking strategy is illustrated in (16): in this example from RSL, space is used to mark reflexivity on the predicate via articulation of the verb at the locus associated with the speaker, as indicated by the subscript *1*.

Furthermore, reflexivity may also be marked through object omission, a strategy often used with verbs which are articulated on the signer's body and denote activities that are usually inherently reflexive. This strategy is illustrated in (17), where the use of the body-anchored verb BATHE in ASL combined with object omission legitimizes a reflexive reading. Furthermore, this strategy has also been reported by Kimmelman (2009) for RSL and NGT.

(17) *ASL* (adapted from Sandler & Lillo-Martin 2006: 375)
JOHN BATHE.
'John bathes [himself].'

Little work exists on reflexivity in NGT. Kimmelman (2009), however, tested an elicitation task on 3 native Deaf signers of NGT, with a focus on reflexive pronouns, and identified a few different strategies available for the expression of reflexivity in this language. Namely, the author reports the use of a non-agreeing body-anchored reflexive pronoun ZELF, which must mandatorily be accompanied by a pronominal pointing sign in non-first-person constructions (18a,b) and cannot be combined with a pointing sign in first-person constructions (19a,b). Though the author describes ZELF as non-agreeing because it cannot be spatially modified to agree with its referent, he analyzes the combination of the reflexive pronoun with a pronominal pointing sign in non-first-person constructions as a form of agreement. He furthermore attributes the illegitimacy of first-person constructions involving a

reflexive pronoun and a pronominal pointing sign to the fact that ZELF is body-anchored and must therefore be implicitly first-person[7].

(18) *NGT* (adapted from Kimmelman 2009: 32)
a. BOY IX3a ZELF+IX3a TALK.
b. *BOY IX3a ZELF TALK.
'The boy talks to himself.'

(19) *NGT* (based on Kimmelman 2009: 32)
a. IX1 ZELF TALK.
b. *IX1 ZELF+IX1 TALK.
'I talk to myself.'

(20) *NGT* (adapted from Kimmelman 2009: 34)
a. BOY IX3a GIRL IX3b ABOUT ZELF+IX3a 3aTELL3b.
b. BOY IX3a GIRL IX3b ABOUT IX3a 3aTELL3b.
'The boy tells the girl about himself.'

(21) *NGT* (Kimmelman 2009: 34)
a. IX1 ZELF LOOK1.
b. IX1 LOOK1.
'I looked at myself.'

Moreover, ZELF can be replaced with a pointing sign (cf. (20a) with (20b)) and all agreeing verbs may be reflexivized, though this is not mandatory, and may co-occur with ZELF (21a) or not (21b). Lastly, as mentioned earlier in this section, Kimmelman (2009) also reports the use of object omission to encode reflexivity in constructions involving body-anchored verbs.

As mentioned in the previous section on reflexivity in spoken languages, reflexives seem to be closely linked to reciprocals and emphasizers, among others. The Dutch emphasizer *zelf* is diachronically related to the reflexive *zichzelf* and the English *-self* reflexive pronouns can also be used as emphasizers. Similarly, a close relationship between reflexive pronouns and emphasizers has also been reported for sign languages, including NGT, for which the emphasizer use of ZELF has been widely attested (cf. de Clerck & van der Kooij 2005 and Kimmelman 2009 on NGT, Kayabaşı & Abner 2022 on TİD, among others). Moreover, the reflexive pronoun in ASL can be used as a copula (Sampson & Mayberry 2022).

Despite the similarities between spoken and sign languages, the literature reviewed in this section highlights a key difference between the two modalities, which may yield formerly unattested strategies to express reflexivity in human language: the use of space to mark reference. The study of reflexivity in sign languages is therefore of the utmost importance when it comes to drawing generalizations regarding this phenomenon and understand which aspects are modality-specific or modality-independent. In this study, I aim to test and expand Kimmelman's (2009) findings by analyzing data from Corpus NGT (Crasborn et al. 2008) and formalizing it through Functional Discourse Grammar's typology of reflexive constructions (Giomi 2021), which will be presented in the next section.

[7] It should be noted, however, that a contradicting example of a first-person construction involving ZELF and a pronominal sign is given in Kimmelman (2009: 34): IX1 GIRL IX3b ABOUT ZELF+IX1 1TELL3b ('I tell the girl about myself.').

3. A Functional Discourse Grammar typology of reflexivity

As mentioned in section 2.1.1 on reflexivity in spoken languages, traditional classifications of reflexive constructions typically describe these constructions based on morphosyntactic factors, making a distinction between predicate marking strategies and argument marking strategies. Other approaches, such as Binding Theory, consider formal aspects of reflexivity to describe the phenomenon. Building on Hengeveld & Mackenzie's (2008) Functional Discourse Grammar (FDG) model, Giomi (2021) proposes a typology of reflexive constructions based on pragmatic and semantic factors. In the following subsections, we will first introduce FDG's model of grammar, with a focus on those features that are relevant for the description of reflexivity. We will then present Giomi's (2021) typology of reflexives from an FDG perspective.

3.1 Functional Discourse Grammar: the model

FDG (Hengeveld & Mackenzie 2008) is a top-down, functional, and typology-driven model of language which aims to describe the structure of language in relation to the way it is used. As it belongs to the functional paradigm, its aim is to identify specific functions or communicative intentions and to describe the specialized linguistic forms used to encode these functions (Keizer 2015). It is a top-down model in that it starts with a speaker's communicative intention, subsequently working its way down from Pragmatics, to Semantics, Morphosyntax and Phonology, the four linguistic levels of analyses which it distinguishes. These levels are organized hierarchically in the following order–the Pragmatic or Interpersonal Level (IL), the Semantic or Representational Level (RL), the Morphosyntactic Level (ML) and the Phonological Level (PL)–and make up the Grammatical Component, which constitutes the Functional Discourse Grammar of a given linguistic system. For more information on FDG's other components, see Hengeveld & Mackenzie (2008) and Keizer (2015).

In this study, we are interested in identifying, describing, and formalizing reflexive constructions in NGT, with the starting point thus being the speaker's intention to signal the co-referentiality between two or more participants of an event. Given FDG's central aim of describing the specialized linguistic forms used to encode specific functions, we will focus only on those cases in which this phenomenon is formally encoded at the ML or the PL. Importantly, it should be mentioned that each level of analysis comprises several layers, which are hierarchically organized, and every layer has its own variable, head and one or more operators. As Giomi's (2021) typology of reflexives is based on pragmatic and semantic properties, we provide below a brief description of the IL and the RL and focus specifically on the layers relevant for the description of reflexivity. The interested reader is, however, referred to Hengeveld & Mackenzie (2008) and Keizer (2015) for a more complete description of the FDG model.

The IL represents the formally encoded linguistic aspects of an utterance pertaining to the interaction between a speaker and an addressee. Thus, it does not represent the content of the utterance, but rather the linguistic actions taken by the speaker to express his/her communicative intentions. This level is composed by 8 layers, each symbolized by a variable, in brackets, and each representing a linguistic unit or action: i) the Move (M), which Kroon (1995: 66) characterizes as being the "minimal free unit of discourse" and which is used to start an interaction or provoke a reaction from the addressee; ii) the Discourse Act (A), which Kroon (1995: 65) defines as the "smallest identifiable units of communicative behaviour", distinguishable from the Move by the fact that it does not necessarily further the communicative act; iii) the Illocution (F), which represents the linguistic forms available in a language to encode different communicative intentions (e.g., Declarative, Interrogative and Imperative Illocutions); iv) the Speech Participants (Ps), which represent the speech participants involved in a communicative interaction and alternate between S(peaker) and

A(ddressee)—importantly, they are not referring expressions but rather represent the discursive role taken by each speech participant in a given communicative setting; v) the Communicated Content (C), which consists of Ascriptive (T) and Referential (R) Subacts and represents the speaker's wish to evoke or refer to certain entities and to ascribe properties to these entities before selecting the corresponding lexical means at the RL; and lastly, vi) the Ascriptive Subact, which evokes properties, and vii) the Referential Subact, which evokes referents and may either introduce new entities or add information about previously mentioned entities.

As evidenced by the short descriptions provided for each layer, only the last three—the Communicated Content, the Ascriptive Subact, and the Referential Subact—are relevant for describing reflexive constructions as they are the ones that allude to the participant structure of an event being communicated by a speaker. Let us consider (22), which illustrates the way these layers are formalized in FDG:

(22) The cat ate a mouse.
$(C_1: [(T_1)\ (+id, +s\ R_1: (T_2)^{R1})\ (-id, \pm s\ R_2: (T_3)^{R2})]^{C1})_{FOC}$

Communicated Contents are usually headed by one or more Subacts—3 in this case (T_1, R_1 and R_2)—, the configuration of which is determined by the pragmatic function they fulfill (i.e., Focus, Topic, or Contrast)[8]. Referential Subacts evoke entities. T's ascribe properties to entities. Thus, in this example, the speaker evokes two entities or referents, *the cat* and *a mouse*, which are represented with the Referential Subacts R_1 and R_2, respectively. The relation between these two entities is then specified with the property *ate* which is represented with the Ascriptive Subact T_1. Furthermore, Ascription also takes place within the two Referential Subacts, as T_2 and T_3 represent the act of ascribing the properties *cat* and *mouse* to each one of the referents R_1 and R_2. Lastly, Referential Subacts may also take operators whose role is to specify the identifiability (+- id) of a referent for the Addressee and/or the specificity (+-s) of the referent for the Speaker. Thus, *the cat* is coded as (+id, +s), since the definite article suggests that the speaker assumes the entity in question is identifiable by the addressee and that the speaker has a specific entity in mind, whereas *a mouse* is coded as (-id, ±s), since the indefinite article suggests the entity is assumed not to be identifiable by the addressee and it is not possible to determine in this context whether the speaker has a specific entity in mind. Importantly, square brackets enclose units that are equipollent, that is, units that are not in a hierarchical relation in relation to each other. Round brackets, on the other hand, represent hierarchical embedding.

Whereas the IL represents the linguistic actions taken by a speaker, the RL represents the semantic content of the input received from the IL that is independent from the speaker's communicative intention, that is, whereas the units from the IL evoke, the units from the RL designate. It is at the RL that the kinds of entities referred to by a Referential Subact at the IL are lexically specified. Furthermore, this level distinguishes between 4 basic semantic categories, organized in the following hierarchical order: i) the Propositional Content (p), which represents mental constructs regarding factual or non-factual information that can be believed, wished for or known; ii) the Episode (ep), which corresponds to a combination of State-of-Affairs that is characterized in terms of time, place and participants; iii) the State-of-Affairs (e), which represents real or non-real entities such as actions, events, processes or states, which are located in place and time; and iv) the Configurational Property (f^c), in which the "situational concept" of a State-of-Affairs is represented, which contains individuals and lexical properties and is not anchored in time or location. Further semantic categories include

[8] For reasons of space and because the assignment of these pragmatic functions to Subacts or Communicated Contents falls outside of the scope of this paper, we will not expand on this matter. The interested reader is invited to read Hengeveld & Mackenzie (2008) and Keizer (2015: 73-78).

Locations (l), Times (t), Individuals (x) and Lexical Properties (f). It's in the layer of the Configurational Property that argument structure is specified, making this layer the most relevant for the description of reflexive constructions. Example (23) illustrates the way the Configurational Property is formalized in FDG:

(23) The cat ate a mouse.
(f^{c}_1: [(f_2: eat ^{f2}) (1x_1: (f_1: cat ^{f1}) ^{x1})$_A$ (1x_2: (f_3: mouse ^{f3}) ^{x2})$_U$] ^{fc1})

Configurational Properties correspond to abstract predication frames which contain a predicate and its arguments and are devoid of any time or location specification. This example constitutes a two-place frame. It contains the predicate *eat* and the arguments *cat* and *mouse*, which are represented as two distinct Individuals (x), which are in turn restricted by Lexical Properties (f), as indicated by the colons. Furthermore, they are specified in terms of number, indicated by the operator *1*, and their semantic functions, as indicated by the subscripts *A* and *U*, which designate the semantic functions of Actor and Undergoer, respectively.

Seeing how FDG is a typology-based model, our study makes a significant contribution to the model by providing it with data on reflexivity from a sign language and setting the grounds for future cross-modality comparisons of reflexivity within the model. Having just briefly presented the IL and the RL[9], let us now present Giomi's (2021) typology of reflexives.

3.2 An FDG typology of reflexivity

Giomi (2021) proposes a tripartite typology of reflexivity based on pragmatic and semantic factors: two-place reflexives, one-place reflexives and a third type which combines features of the other two. Let us briefly present each type.

The first type, *two-place reflexives*, refers to constructions consisting of a two-place frame in which there are two overtly expressed arguments, meaning that the relevant participant is linguistically encoded twice, such as in English (24a,b) and in Tahitian (25), an Oceanic language. The general form of the corresponding IL and RL frames is represented in (26), adapted from Giomi (2021: 186; 217):

(24) *English*[10]
a. I hate myself.
'1.SG.NOM hate REFL'
b. They self-congratulated themselves.
'3.pl.nom refl-congratulate.pst refl.3.pl

(25) *Tahitian* (adapted from Giomi 2021: 188)
'Ua taparihi rātou iā rātou iho.
PERF hit 3.PL OBL 3.PL REFL
'They hit themselves.'

(26) Two-place reflexives
IL: (C_1: [(T_1) (R_1) (R_2)] ^{C1}))
RL: (f^{c}_1: [({π} f_2: (f_2)) (v_1)a (v_1)$_\phi$] ^{fc1}))

[9] Further specific details on the principles and formalisms of FDG will be provided along the paper when necessary.
[10] The examples are my own.

The two overtly expressed arguments *I* and *myself* in (24a), *They* and *themselves* in (24b) and *rātou* and *rātou* in (25) are represented by $(v_1)_A$ and $(v_1)_\phi$[11] in (26). At the IL, the C is headed by three Subacts, with T_1 representing the properties *hate*, *congratulate* and *hit*, and R_1 and R_2 the two entities that are invoked in each case and to which T_1 is ascribed. It should be noted that in (24a,b) and (25), ascription does not take place within R_1 and R_2 as it did in example (22) as no properties are ascribed to the referents, since they are referred to with pronouns. Co-referentiality between both arguments is encoded through the subscript *1* at the RL. Furthermore, one key aspect differentiates (24a,b) from (25): whereas the reflexive markers (*myself* and *themselves*) in the former are pronominal and designate one of the two arguments of the two-place predication, the one (*iho*) in the latter is not pronominal nor does it designate one of the arguments, but rather functions as the only explicit marker of reflexivity – without it, the complement pronoun *rātou* could be referring to a distinct referent. Thus, the co-indexation of two arguments triggers the special pronouns *myself* and *themselves* in English and the special reflexive marker *iho* in Tahitian. Importantly, (24b) is furthermore different from (25) in that, without the verbal prefix *-self,* the two arguments would still be unambiguously co-referent. Moreover, the English prefix may also occur in one-place frames (e.g, *They tend to self-contradict.*) as will be explored below, whereas the Tahitian reflexive marker may not. Constructions like (24b) thus have a reflexive operator, such as prefix *-self*, which is represented by π at the RL. The curled brackets around the reflexive operator indicate that the operator can be left unspecified or unrealized, depending on the language or construction.

The second type of reflexive construction, *one-place reflexives*, refers to constructions consisting of an underlying one-place frame in which the relevant participant is encoded only once, that is, intransitive constructions. Furthermore, the constructions subsumed under this type make explicit reference to reflexivity. Examples (27) and (28) illustrate such constructions in English and Kolyma Yukaghir, a language spoken in Eastern Russia, respectively. The general form of the respective IL and RL frames is presented in (29), based on Giomi (2021: 217-218).

(27) *English*[12]
They tend to self-contradict.
3PL.NOM tend INF REFL-contradict

(28) *Kolyma Yukaghir* (Maslova: 1837)
Tudel met-juö-j.
3PL.NOM REFL-see-3.SG.INTR
'He is looking at himself.'

(29) One-place reflexives
IL: $(C_1: [(T_1)\ (R_1)]^{C1})$
RL: $(f^c{}_1: [(\pi\ f_2: (f_2))\ (v_1)_A]^{fc1})$

In these constructions, only one argument is overtly expressed, as indicated by the presence of a single argument slot at the RL. Furthermore, it is presupposed that a single Referential Subact is performed at the IL (R_1), which in turn corresponds to the single argument ($(v_1)_A$) at the RL. Moreover, these constructions have a reflexive operator which cannot be left unspecified or unrealized, as indicated by the absence of curly brackets containing π. In this type of construction, the reflexive operator must simultaneously act as an intransitivizer and encode reflexivity.

[11] The subscript ϕ is employed to indicate the variability of the non-actor argument's referentiality.
[12] The example is my own.

Lastly, the third type refers to constructions in which the predicate behaves as intransitive despite the linguistic encoding of two participants and therefore shares properties of both transitive and intransitive constructions. Let us consider examples (30) and (31) from French and Uradhi, a language spoken in Queensland, Australia, respectively, and their general formalism at the IL and RL in (32), based on Giomi (2021: 203; 217-218):

(30) *French*[13]
Il s'est lav-é.
3.SG.MASC REFL-be.AUX.3.SG wash-PST
'He bathed.'

(31) *Uradhi* (Giomi 2021: 203)
Ama uluma~uluma uɣa-:ni.
man.ABS 3.SG~REFL smell-INTR
'The man is smelling himself.'

(32) Reflexives with transitive and intransitive properties
IL: $(C_1: [(T_1) (R_1) (R_2)]^{C1})$
RL: $(f^c_1: [(f^c_2: [(\{\pi\} f_3: (f_3)) (v_1)_\phi]^{fc2}) (v_1)_A]^{fc1})$

The French construction behaves as a transitive construction in that it contains two arguments, *il* and *se*, but behaves as an intransitive construction in that it uses the auxiliary *être* ('be'), which is used to form the perfect tense of intransitive verbs, instead of the auxiliary *avoir* ('have'), which is used to form the perfect tense of transitive verbs. Similarly, the Uradhi construction behaves as a transitive construction in that it also contains two arguments, *ama* and *uluma~uluma*, but behaves as an intransitive construction in that an intransitivized form of the verb is used. The transitive and intransitive properties of these constructions are captured at the RL, where a superordinate Configurational Property (f^c_1) has as its main predicate a Configurational Property (f^c_2) with an internal argument ($(v_1)_\phi$). The transitive aspects of these constructions are triggered by the presence of a single argument in the main predication, whereas the intransitive aspects are triggered by the presence of an argument which can be assigned the role of the Undergoer within the embedded predicate. Moreover, it should be noted that the reflexive operator may be realized or left unspecified, depending on the construction, as shown by the curled brackets.

Finally, constructions like *John washes* are explained through FDG based on the principle that certain lexical predicates, such as *wash*, may occur in different types of predication. Thus, *John washes* is not considered a separate reflexive construction but rather as a construction in which a predicate that is typically used in two-place predications takes one single argument instead of two. Although this is more frequently observed with inherently reflexive predicates such as *wash* it may also apply to non-inherently reflexive verbs.

In Sections 2 and 3, I covered previous studies on reflexivity in spoken and sign languages, showing that similar observations have been made for both modalities. I also introduced key concepts for this study, including the use of space to mark referentiality in sign languages and Giomi's (2021) typology of reflexives from an FDG perspective. The contribution of the current paper is two-fold: i) I will identify and describe the available reflexive constructions in NGT based on naturalistic data extracted from Corpus NGT, thus adding to Kimmelman's (2009) study, and ii) test the suitability of FDG's model regarding reflexivity in sign languages by formalizing the reflexive constructions identified in the

[13] The example is my own.

corpus through FDG, using Giomi's (2021) typology. The study will thus be guided by the following research questions:

a) What are the available reflexive constructions in NGT?
b) To which of FDG's reflexive types do they belong?

Based on Kimmelman's (2009) report on reflexivity in NGT, it is expected that Deaf signers of NGT will employ the optional reflexive pronoun ZELF to mark reflexivity combined with a pointing sign or by itself, make use of reflexivized agreeing verbs or pronominal pointing signs, and omit the object argument, and that NGT will exhibit all three types of reflexivity proposed by Giomi (2021). I also expect that the use of space to indicate referentiality in sign languages may yield possibilities formally unattested in spoken languages. In the following section I will present the methodology employed in this study.

4. Methodology

This work is based on naturalistic examples extracted from Corpus NGT (Crasborn et al. 2008). Occasionally, the online NGT dictionary of the Dutch Sign Center (Nederlands Gebarencentrum, 2023) was used to disambiguate the meaning of specific signs. ELAN (*ELAN* (Version 6.5) [Computer software] 2023) was used to code the examples extracted from the corpus.

4.1 Corpus NGT

Corpus NGT (Crasborn et al. 2008) features a collection of dialogues in NGT, containing more than 72h of video recordings of personal stories and discussions about Deafness and sign language, of which circa 25% have been translated into Dutch. The corpus is stored in *The Language Archive* at the Max Planck Institute for Psycholinguistics, the Netherlands (König 2011), and covers productions of 104 Deaf signers, native and near native, from five different regions of the Netherlands (Amsterdam, Groningen, Rotterdam, St. Michielsgestel and Voorburg) (Zwitserlood et al. 2006-2008) and different ages (17-84).

4.2 Search Procedure and data selection

For this study, I first conducted a primary search for reflexive pronouns (*mijzelf*, *mezelf*, *zich*, *zichzelf*, *jezelf*, *jijzelf*, *vanzelf*) on the Dutch translation tiers of Corpus NGT, which yielded 356 results. Conducting a search on the gloss tier was not an option as the only searchable unit would have been ZELF, which can function either as a reflexive pronoun or as an emphasizer. On top of that, the aim of the study was to develop a comprehensive picture of NGT's system of reflexives and to identify every possible reflexive construction available in this language. Some of the reflexive constructions reported by Kimmelman (2009) for NGT, such as the ones characterized by omission or the use of a pronominal pointing sign, could not have been identified in the corpus by searching in the gloss tier. Searching on the gloss tier would thus have excluded some constructions from our pool. Searching on the Dutch translation tier, on the other hand, proved to be the most comprehensive option as the search for Dutch reflexive pronouns allowed for the identification of different linguistic forms based on one function.

From the results obtained with the initial search for Dutch reflexive pronouns, I excluded (i) all non-glossed instances; (ii) instances in which a reflexive pronoun was used emphatically; (iii) all examples in which a reflexive pronoun was part of an adjunct, and therefore not part of the core participant structure; and (iv) all instances in which the predicate had been omitted. The final dataset comprised 55 instances which could unambiguously be identified as reflexive constructions, that is, constructions in which two or more arguments of a transitive predicate were co-referential. The potentially relevant examples come from 37 videos containing naturalistic data from 26 signers (cf.

Supplement 1 which lists all 55 instances of reflexivity and contains information regarding the source of the data, the signer and time).

4.3 Data coding

The data used for this study had all been previously glossed and further translated into Dutch and was subsequently annotated with ELAN (*ELAN* (Version 6.5) [Computer software] 2023) for the purposes of the research. I used the following relevant tiers from Corpus NGT—GlossL S1, GlossR S1, GlossL S2, GlossR S2, TranslationFree S1, TranslationFree S2, TranslationNarrow S1 and TranslationNarrow S2—, of which the first four provided me with the glosses for each case and the last four with the corresponding Dutch translations. I then created new separate tiers to code the presence of reflexivity, the marking or non-marking of reflexivity, the strategy used for the marking of reflexivity, person and number, the predicate, the English translation, and comments (see Table 1 for the coding scheme and Figure 1 for a screenshot with all tiers).

Table 1 – coding scheme used in ELAN.

Tier Name	**Function**	**Code**
English Translation	Translation into English	
Reflexivity	Marks instances of reflexivity	Reflex
Person + Number	Indicates person and number	1, 2, 3, P(lural), S(ingular)
Marking	Indicates the strategy used for the marking of reflexivity	RP (ZELF), RP + PP (ZELF and a pronominal pointing sign), A (reflexivized agreeing verb), A + PP (reflexivized agreeing verb and a pronominal pointing sign), PP (pronominal pointing sign), Omission (object omission)
Verb	Indicates the predicate used in a given construction	
Comments	Additional comments	

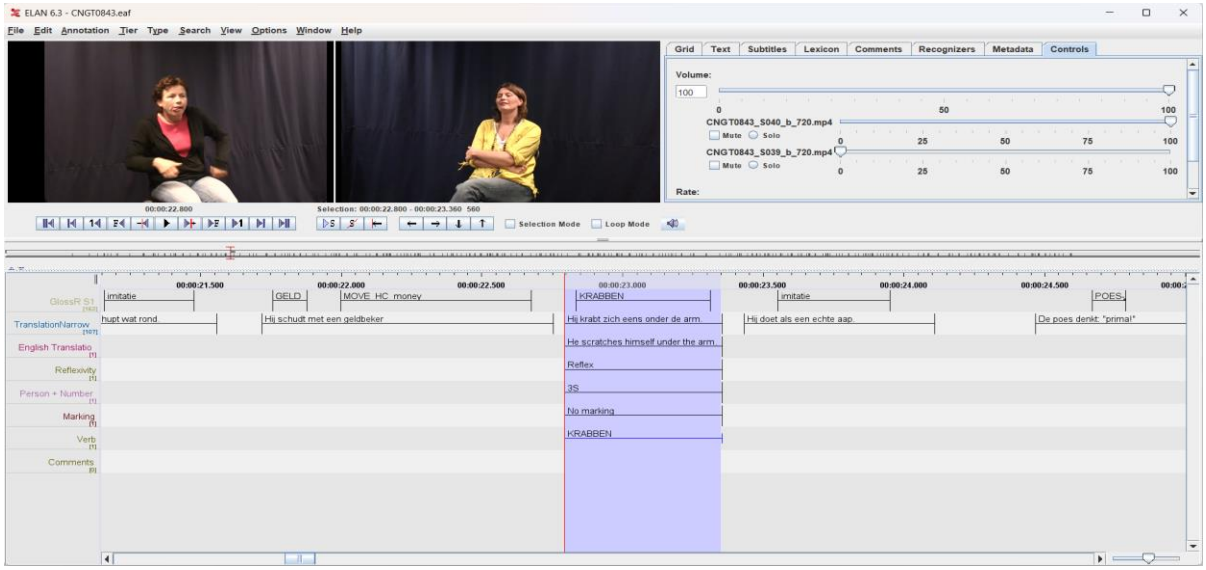

Figure 1 – A screenshot showing the viewing window for ELAN, with annotation tiers at the bottom of the screen.

5. Results

5.1 Quantitative overview

After applying the aforementioned exclusion criteria, I arrived at a final dataset comprising 55 cases of reflexivity. The analysis of the corpus data allowed for the identification of 7 strategies: i) marking through reflexivized verbal agreement, ii) marking through reflexivized verbal agreement combined with a pronominal pointing sign, iii) marking through use of EIGEN, iv) marking through use of a pronominal pointing sign, v) marking through use of the reflexive pronoun ZELF, vi) marking through use of the reflexive pronoun ZELF and a pronominal pointing sign, and vii) object omission. Concerning these strategies, a distinction was made between those strategies in which reflexivity was explicitly encoded through a specialized grammatical marker and those strategies in which no specialized marker was employed to encode reflexivity. The former were subsumed under the category *Grammatical marking* and the latter under the category *Null-marking*. This distinction will be especially relevant for Section 6.3, which will be dedicated to the formalization of NGT's reflexive constructions with the FDG framework. Table 2 provides an overview of the strategies that were identified and their frequency and count.

Table 2 – observed strategies used for the marking of reflexivity in NGT and corresponding count and percentage.

Category	**Strategy**	**N**	**Percentage**
Grammatical marking	Reflexive pronoun ZELF	12	21.82%
	Reflexive pronoun ZELF + pronominal pointing sign	3	5.45%
	Reflexive verbal agreement	6	10.91%
	Reflexive verbal agreement + pronominal pointing sign	2	3.64%
	EIGEN	1	1.82%
Subtotal		**24**	**43.64%**
Null-marking	Object omission	27	49.09%
	Pronominal pointing sign	4	7.27%
Subtotal		**31**	**56.36%**
Total		**55**	**100%**

Furthermore, a total of 17 different predicates were identified in the data set, including agreeing, plain, inherently reflexive, and non-inherently reflexive verbs. The 3 most common verbs were DEVELOP, SEE, and ADAPT (cf. Annex 1 for a comprehensive table in which all 17 verbs are listed together with their count and the strategies in which they were attested).

In the following subsections, I will present the two categories mentioned above and describe the strategies subsumed under each category, thus focusing on the first research question that was raised in section 3. Furthermore, the last subsection will be dedicated to cases displaying further typological distinctions regarding some non-reflexive uses of ZELF.

5.2 Grammatical marking

I subsume under this category every construction in which reflexivity was explicitly encoded through linguistic markers, that is, every construction in which a specialized morphosyntactic reflexive marker was used. In the following subsections, I will describe the specialized strategies identified for the marking of reflexivity in NGT.

5.2.1 ZELF constructions

Within the category of *grammatical marking*, the marking of reflexivity with the non-agreeing body-anchored reflexive pronoun ZELF (see Figure 2 for a visual representation) was the most frequently attested strategy (15 cases).

Figure 2 – Sign ZELF in NGT as used in (33).

This strategy was characterized by the use of ZELF to encode the co-referentiality between the agent and the undergoer of an event, either by itself (12 cases), or co-occurring with a pronominal pointing sign (3 cases). Note that the use of ZELF as the sole reflexive marker was attested only for non-first person and that the use of ZELF together with a pointing sign was attested only for first person. Examples (33) and (34) illustrate each strategy, respectively: in (33), the co-reference of the non-first-person agent and undergoer arguments of the predicate DRESS is marked by the reflexive pronoun ZELF, whereas in (34), the reflexive pronoun is accompanied by a first-person pronominal pointing sign to encode the co-referentiality between the first-person agent and undergoer arguments of SEE. Furthermore, the pointing sign IX1 is repeated one second time, perhaps due to the fact that it is part of an embedded clause.

hs
(33) IX3a **ZELF** DRESS AND-SO-FORTH.
3.SG REFL dress thus
'He can't dress himself and so forth.'

(CNGT0132-S007-05:38:920 - 05:40:560)

(34) IX1 **ZELF IX1** SEE IX1 DEAF.
1.SG REFL 1SG see 1.SG deaf
'I see myself as a Deaf person.'

(CNGT1791-S074-00.45.080 - 00.48.240)

5.2.2 Reflexive verbal agreement constructions

Typically, the reflexive form of agreeing verbs starts in the neutral space and ends at the locus associated with the argument that is being reflexivized. Our data shows that agreeing verbs can be reflexivized in NGT, with this having been the second most frequent strategy used within the category of grammatical marking (8 cases). Moreover, the reflexive form of an agreeing verb may occur by itself (6 cases), as in (35a,b), or be accompanied by a pronominal pointing sign (2 cases), as in (36).

Example (35a) illustrates the first-person form of the reflexivized agreeing verb FILM (see Figure 3 for a visual depiction of the reflexivized form of the agreeing verb FILM used in (35a), which starts in the neutral space and ends at the locus associated to first person), whereas in example (35b) a non-first-person form of the reflexivized agreeing verb DEVELOP is used.

(35) First and non-first person reflexivized agreeing verbs:

a. MOETEN IX1 **FILM1**.
must 1SG film.REFL.1SG
'Then I must film myself.'

(CNGT0539_S026_01:28.280 – 01:28.920)

b. IX3a ALREADY **DEVELOP3a**.
3.SG already develop.REFL.3SG
'He/she has already developed [him/herself].'

(CNGT0529_S025_04:47.880 – 04:48.680)

Figure 3 – First person reflexive form of the agreeing verb FILM in NGT as produced in (35a).

(36) First-person reflexivized agreeing verb followed by pronominal pointing sign:
WHY PREPARE MOVE-CL **FILM1** **IX1** SIGN PERFECT STAMP READY SEND.
why prepare move.CLAS film.REFL.1SG 1SG sign PERF stamp PERF send
'Why all the preparation, setting up the camera, filming myself, gesturing until it's right and then sending it to the post?

(CNGT0539_S025_01 35.600 – 01:39.640)

In example (36), the agreeing verb FILM is reflexivized for first-person and accompanied by a first-person pointing sign. Note that I attested the use of a reflexivized agreeing verb without a pronominal pointing sign for both first (35a) and non-first (35b) person instances, but attested the use of a reflexivized agreeing verb followed by a pronominal pointing sign only for first-person instances (36).

5.2.3 EIGEN constructions

Finally, I identified in the corpus one other manual sign which was used as a reflexive marker to explicitly encode reflexivity, namely the possessive pronoun EIGEN ('own'). However, only one instance of this use of EIGEN was identified. This instance is illustrated in (37), where EIGEN is used to encode the reflexivity of a construction with the predicate DEVELOP. It's worth noting that the signer mouthed the Dutch word *zelf* while producing the sign EIGEN. Figure 4 provides a visualization of the sign EIGEN as it was realized in example (37).

(37) **EIGEN** DEVELOP.
REFL develop
'Then it will develop itself.'
(CNGT0258_S014_ 01:01.440 – 01:04.360)

Figure 4 – Sign EIGEN in NGT as produced in (37).

To summarize, five specialized strategies were identified for the linguistic encoding of reflexivity in NGT: i) ZELF constructions, characterized by the use of the reflexive pronoun ZELF by itself or accompanied by a pronominal pointing sign, ii) constructions with a reflexivized agreeing verb occurring by itself or together with a pronominal pointing sign, and iii) EIGEN constructions, in which the possessive pronoun EIGEN was used in a similar fashion to the reflexive pronoun ZELF to encode reflexivity.

5.3 Null-marking

As concerns this category, I considered as null-marked all instances of reflexivity in which the same entity took on the role of at least two participants of an event, typically the agent and the undergoer, and in which no specialized morphosyntactic strategies were employed to encode the co-referentiality of those participants. In this subsection, I will present the two types of null-marking attested in the corpus.

5.3.1 Object omission

Under the category of null-marking constructions, the most frequent type was the one characterized by object omission, that is, constructions characterized by the absence of a specialized reflexive marker and by the omission of the object. In these constructions, the object was dropped and the sentences surfaced as intransitive, despite containing a transitive verb. This was overall the most frequently attested strategy in the corpus (27 cases). Let us consider examples (38a,b,c,d).

(38)

a. IX-1 DRESS SHOWER.
1SG dress shower
'I dressed, showered.'

(CNGT0805_ S035_ 01:24.640 – 01:25.560)

b. IX-1 DAUGHTER ALMOST SLEEP ALREADY UNDRESS ALREADY TELEPHONE.
POSS.1SG daughter almost sleep already undress already telephone
'My daughter was almost going to bed, she had already undress when we called.'

(CNGT0284_ S018_ 07:09.680 – 07:14.080)

c. MIRROR SEE NOT-YET SEE.
mirror see not-yet see
'[I] hadn't seen myself in the mirror yet.'

(CNGT0284_S018_ 05:29.560 – 05:30.280)

hs
d. IX-1 MOTHER CAN CONTROL.
POSS.1SG mother can contain
'My mother couldn't contain [herself].'

(CNGT0369_S019_ 01:17.320 – 01:18.560)

The examples just provided show the versatility and lack of constraints of this strategy. In example (38a), for instance, this strategy is used with a first-person subject and the *grooming*, body-anchored verbs DRESS and SHOWER. In example (38b) this strategy is again combined with a *grooming*, body-anchored verb, UNDRESS, but with a non-first-person subject. Furthermore, a non-reflexivized and non-agreeing form of the agreeing verb SEE is used in (38c) and a plain non-grooming verb, CONTROL, is used in (38d).

5.3.2 Constructions with pronominal pointing signs

These constructions were characterized by the fact that the undergoer of the event was not omitted as in the previous strategy but rather linguistically encoded through a pronominal pointing sign, whose locus was the same as the one associated to the agent argument. It should be noted that, despite the grammatical and referential nature of the pointing signs used in these constructions, they are not specifically used to encode reflexivity, hence their inclusion under the category *Null-marking*. This type of construction is illustrated in (39), in which the first first-person pointing sign encodes the subject of SEE with the role of agent whereas the second instance of the first-person pointing sign occurs in object position, between the subject and the verb. The pointing signs in question express co-referentiality but are not used as specialized markers of reflexivity. Furthermore, it is worth noting that a non-reflexivized and non-agreeing form of the agreeing verb SEE is being used in (39), instead of the expected reflexivized form.

hs
(39) IX-1 IX-1 SEE BUT IX-1 DISABLED.

1SG 1SG see but 1SG disabled
'I don't see myself as disabled.'

(CNGT0005_S003_ 01:53.950 - 01:55.231)

To summarize, two types of null-marking of reflexivity were identified: i) null-marking constructions characterized by omission of the object and ii) null-marking constructions characterized by the use of a plain pronominal pointing sign.

5.4 Further non-reflexive typological distinctions

As mentioned in section 2.2.3, ZELF is polysemic since it can behave both as a reflexive pronoun and as an emphasizer. In what concerns non-reflexive uses of ZELF, I identified two other non-reflexive uses of the sign: i) an anticausative use (40) and ii) a possessive use (41).

(40) Anticausative use of ZELF:
ZELF OPEN.
ANTICAUSATIVE open
(The door) opens.

(CNGT0325_S015_00:37.360 – 00:38.400)

(41) Possessive use of ZELF:
GEBAREN ZELF TAAL.
gesture own language
'My own language, sign language.'

(CNGT0253_S014_05:05.080 - 05:16.080)

In example (40), the transitive verb OPEN integrates an anticausative construction, which seems to be triggered by the use of ZELF. In (40), on the other hand, ZELF is used as a possessive pronoun.

6. Discussion

The research questions guiding this study were a) what are the available reflexive constructions in NGT and b) to which of FDG's reflexive types do they belong? To answer these questions, we analyzed 37 videos from Corpus NGT containing naturalistic data from 26 signers.

As concerns the first question, I presented in the previous section the constructions available for the expression of reflexivity in NGT as well as some non-reflexive uses of ZELF based on corpus data from Corpus NGT. More specifically, I identified seven strategies to encode reflexivity: i) use of the reflexive pronoun ZELF; ii) use of the reflexive pronoun ZELF together with a pronominal pointing sign; iii) use of the reflexivized form of an agreeing verb; iv) use of a reflexivized agreeing verb together with a pronominal pointing sign; v) use of EIGEN; vi) object omission; and vii) use of a pronominal pointing sign. Of these, only the first five correspond to specialized reflexive constructions. Furthermore, I also identified two non-reflexive uses of ZELF: i) the anticausative use, and ii) the possessive use. The nine reflexive and non-reflexive constructions that were identified in this study will be discussed in relation to other sign languages in subsection 6.1 and to spoken languages in section 6.2.

As regards the second research question, I will attempt to answer it in subsection 6.3, where I will analyze the five specialized reflexive constructions in light of Giomi's (2021) FDG typology of reflexivity.

6.1 Reflexivity in NGT and other sign languages

Kimmelman (2009) reports four different strategies for the expression of reflexivity in NGT based on an elicitation task tested on three native Deaf signers: i) the use of ZELF, which must occur by itself in first-person constructions and be followed by a pronominal pointing sign in non-first-person constructions; ii) the use of a plain pronominal pointing sign, iii) the use of the reflexivized form of an agreeing verb, which may or not co-occur with ZELF; and iv) object omission.

The data from the current study, however, shows that ZELF can in fact be combined with a pronominal pointing sign in first-person constructions and occur by itself in non-first-person constructions, suggesting that the reflexive pronoun is not constrained by person features. Furthermore, contrary to what Kimmelman (2009) hypothesizes regarding the nature of ZELF, the fact that the reflexive pronoun can co-occur with a pronominal sign or occur by itself regardless of person specification suggests that it may in fact not be implicitly first-person, but rather unspecified for person. What's more, it seems that, as reported by Kimmelman (2009) for RSL, the combination of ZELF with a pointing sign is in fact optional.

Furthermore, the data attests the possibility of using the reflexivized form of an agreeing verb to express reflexivity as well as the use of non-reflexivized forms of agreeing verbs combined with a pronominal pointing sign, ZELF or object omission, which suggests that verbal reflexivization is optional. Moreover, I found no cases in which the reflexivized form of an agreeing verb was combined with the reflexive pronoun ZELF but did find cases in which the non-reflexivized form of an agreeing verb was combined with the reflexive pronoun and identified two strategies not reported in Kimmelman (2009): one in which a reflexivized verb was accompanied by a plain pronominal pointing sign and one in which EIGEN was used to mark reflexivity. Finally, the data confirms the possibility of expressing co-referentiality between two or more event participants with plain pronominal pointing signs or through object omission and the latter strategy seems to be possible with first and non-first-person constructions, agreeing and non-agreeing verbs and inherently and non-inherently reflexive verbs.

Moreover, as mentioned earlier, reciprocity is closely related to reflexivity cross-linguistically. Interestingly, Pfau & Steinbach (2003) report object omission or dropping as one of the possible ways to encode reciprocity in German Sign Language (DGS). Importantly, however, this strategy was found to be lexically specified in DGS. Parallelly, argument omission was the most frequently used strategy in our data, but the range of predicates it can be used with suggests that the strategy is not lexically specified in NGT and that the use of object omission may be bound by discursive aspects instead. Further research is needed to determine whether this is the case.

Lastly, the data shows that space is productively used to encode referentiality in NGT, a modality-specific feature, as it was used in constructions involving pronominal pointing signs and reflexivized agreeing verbs, which amounted to 27.27% of the analyzed data. The possibility to modulate space to unambiguously refer to any given entity furthermore begs the question of why NGT and other sign languages possess specialized constructions to mark reflexivity, while a tentative answer could be that an event in which the same entity simultaneously fulfills the role of the agent and the undergoer is cognitively salient and therefore merits specialized marking. Data from first language acquisition (Pinker 2013) and homesign (Goldin-Meadow et al. 2009) indeed suggests that sensitivity to participant structure is present from a young age, regardless of whether one is exposed to a fully-fledged linguistic system or not, raising questions about the universality of this phenomenon and what we know about sign languages seems to point in that direction.

6.2 Reflexivity in NGT and spoken languages

Traditional accounts of reflexivity based on morphosyntactic features such as Faltz's (2016/1977) typology show a variety of different reflexive constructions in spoken languages, traditionally divided

into argument and verb marking constructions. Our data once again confirms the assumption that NGT, like other sign languages, is as rich and diverse as spoken languages and that sensitivity to reflexivity is modality-independent. More specifically, NGT's reflexive constructions involving ZELF or EIGEN share properties with argument marking constructions, while the constructions involving reflexivized verb forms share properties with verb marking constructions.

Furthermore, the use of non-specialized pronominal pointing signs to mark co-referentiality between two arguments in NGT could be compared to the use of non-specialized non-third person pronouns in reflexive constructions in languages like Portuguese, in which a specialized reflexive construction is only used in third-person constructions, since non-third person constructions are referentially unambiguous but a third person pronoun can have several possible referents (cf. European Portuguese: ***Eu*** *vejo-****me*** *ao espelho,* 'I see myself in the mirror', where the non-specialized accusative pronoun *me* is used; *Ele vê-****o*** *ao espelho*, 'He sees him in the mirror', where the accusative third person singular masculine pronoun *o* is used and *Ele vê-****se*** *ao espelho*, 'He sees himself in the mirror', where the reflexive *se* is used). In spoken languages, third person pronouns are often referentially ambiguous, as they may refer to any entity that is absent from the discursive context (Brener 1983). In NGT and other sign languages, however, the use of space for referentiality blocks any ambiguity concerning the referent of non-first pronouns.

Haspelmath & the APiCS Consortium (2013) consider implicit constructions a type of specialized reflexive construction. These are characterized by the omission of the object of a transitive verb and by licensing only a reflexive reading. I would argue, however, that object omission does not constitute a specialized reflexive construction in NGT despite the frequency of the strategy, since argument omission is a frequent feature across sign languages and a number of non-reflexive interpretations could be licensed (Lillo-Martin 1986, Oomen & Kimmelman 2019, Nordlund 2019).

Furthermore, Dik (1983: 233) raises the question "whether there are any […] verbally marked constructions which are *only* used for indicating reflexive relationships" as often times the same construction may yield different readings depending on the context. This seems to be rare in spoken languages, though such constructions have been sporadically identified in languages such as Blackfoot, an Algonquian language spoken in North America (Giomi 2021). In this regard, it seems that sign languages would cluster together from a typological point of view, given the wide-spread existence of reflexivized verb forms in NGT, RSL and ISL, among others (Meir 1998, Kimmelman 2009), whose only possible reading is reflexive.

Contrastingly and as mentioned in sections 2.1 and 2.2, reflexive markers often fulfil multifarious roles, being closely related to reciprocals, emphatic markers, anticausativizers, copulas, and passivizers, among others, in both spoken and sign languages. The reflexive markers ZELF and EIGEN in NGT are no exception, as shown by the widely documented emphatic use of ZELF as well as by the possessive and anticausativizers uses of ZELF and the reflexive use of EIGEN attested in the current study.

6.3 Reflexive constructions in NGT through an FDG lens

I identified seven different reflexive strategies in NGT. However, since FDG aims to describe specialized linguistic forms, that is linguistic forms that are triggered at the ML or the PL by specific functions, we will consider in this section only the strategies subsumed under the category *Grammatical marking* in section 5. This is because neither the use of plain pronouns nor object omission constitute specialized ways to mark reflexivity in NGT. No distinction is made between reflexive pronouns such as *myself* and regular pronouns such as *me* at the IL. However, reflexive pronouns are the result of the triggering of a specialized form at the ML, whereas regular pronouns are not. Moreover, as was mentioned in section 3, predicates such as *wash* in *John washes* are treated in FDG as lexical predicates which can

occur in different types of predication frames. The same analysis can be applied to the NGT verbs that accept object omission in reflexive contexts. Thus, I will focus on ZELF and EIGEN constructions and constructions involving reflexivized agreeing verbs and show that they can successfully be accounted for using Giomi's (2021) typology, briefly schematized below.

- **Type I: Two-place reflexive constructions**
  IL: (C_1: [(T_1) (R_1) (R_2)] ^{C1}))
  RL: (f^c_1: [({π} f_2: (f_2)) (v_1)a (v_1)$_\phi$] ^{fc1}))

- **Type II: One-place constructions**
  IL: (C_1: [(T_1) (R_1)] ^{C1}))
  RL: (f^c_1: [(π f_2: (f_2)) (v_1)$_A$] ^{fc1}))

- **Type III: Mixed constructions**
  IL: (C_1: [(T_1) (R_1) (R_2)] ^{C1})
  RL: (f^c_1: [(f^c_2: [({π} f_3: (f_3)) (v_1)$_\phi$] ^{fc2}) (v_1)$_A$] ^{fc1})

The NGT constructions involving reflexivized agreeing verbs seem to belong to type II and III, depending on whether they co-occur with a pointing sign. Type II constructions are characterized by behaving as intransitive constructions, overtly expressing one single participant, and making explicit reference to reflexivity. This is exactly what we see in constructions involving a reflexivized verb and no pointing sign, as in constructions like the one in (35b), repeated here as (42). In this example, only one single participant is overtly expressed, signaled by IX3a. It is also cross-referenced only once on the verb DEVELOP, which has been intransitivized and would otherwise be transitive and display subject and object agreement. Furthermore, explicit reference to reflexivity is made through a change in the verb's phonological parameter of movement.

(42) IX3a ALREADY DEVELOP3a.
3.SG already develop.REFL.3SG
'He has already developed [himself].'

(CNGT0529_S025_04:47.880 – 04:48.680)

(43) WHY PREPARE MOVE-CL FILM1 IX1 SIGN PERFECT STAMP READY SEND.
why prepare move.CLAS film.REFL.1SG 1SG sign PERF stamp PERF send
'Why all the preparation, setting up the camera, filming myself, gesturing until it's right and then sending it to the post?

(CNGT0539_S025_01:35.600-01:39.640)

Type III, on the other hand, is characterized by the presence of a predicate which behaves as intransitive despite the overt expression of two or more participants. In (36), now repeated as (43), the predicate FILM has been intransitivized by a modulation of the movement parameter which encodes reflexivity and intransitivizes the verb, but the undergoer argument is overtly expressed with a pointing sign.

ZELF constructions are theoretically challenging. At first glance, one could argue that reflexive constructions in which ZELF occurs by itself belong to type I, which is characterized by having a two-

place frame and overt encoding of the two arguments. If that were the case, ZELF in (33), now repeated as (44), would be a true reflexive pronoun.

hs
(44) IX3a ZELF DRESS AND-SO-FORTH.
3.SG REFL dress thus
'He can't dress himself and so forth.'

(CNGT0132_S007_05:38.920 - 05:40.560)

(45) IX1 ZELF IX1 SEE IX1 DEAF
1.SG REFL 1SG see 1.SG deaf
'I see myself as a Deaf person.'

(CNGT1791_S074_00:45.080 – 00:48.240)

However, as discussed earlier, my results, combined with Kimmelman's (2009) report, suggest that ZELF could be a reflexive marker devoid of person specification and may therefore not establish co-reference with a given antecedent but rather signal the reflexivity of a given construction and act as a reflexive operator. If analyzed under this light, constructions of the type we see in (44) belong to type II and constructions of the type we find in (34), now repeated as (45), to type I. If ZELF were a true reflexive pronoun, then in constructions involving ZELF followed by a pointing sign the relevant participant would be encoded thrice. Instead, similarly to what happens with English prefix *-self*, it seems as though ZELF in (45) could be triggered by the presence of two co-referent arguments, which would still be unambiguously co-referent in the absence of the reflexive operator, just like the English prefix and the co-referential pronouns *they* and *themselves* in *They self-congratulated themselves*. Contrary to what we saw in Tahitian, where the absence of the reflexive marker can yield a non-reflexive reading, the absence of ZELF does not yield such alternative readings in constructions where an entity is referred to by plain pronouns, since the use of space blocks any other possible readings. Furthermore, Giomi (2021) points out that type I reflexives tend to involve elements that can behave as adnominals or as intensifiers, among other functions, and this usage has been widely attested for ZELF (de Clerck & van der Kooij 2005, Kimmelman 2009).

Finally, EIGEN constructions, repeated here as (46), could be of type I or II depending on EIGEN's nature. In (46), the agent argument has been omitted. However, should EIGEN be specified for person and have the same distribution as personal pronouns, constructions like (46) would belong to type I. Should it rather act simultaneously as an intransitivizer and a reflexivizer, (46) would belong to type II. To determine EIGEN's status, however, one would need to analyze more instances like this one and conduct acceptability judgments.

(46) EIGEN DEVELOP.
REFL develop
'Then it will develop itself.'

(CNGT0258_S014_ 01 :01.440 – 01 :04.360)

7. **Conclusion**

In conclusion, I conducted a corpus study on reflexivity in NGT and identified seven different reflexive constructions, five of which were specialized constructions—ZELF constructions with and without a pronominal pointing sign, EIGEN constructions and constructions involving a reflexivized agreeing verb by itself or accompanied by a pronominal pointing sign—and two of which were not—constructions with pronominal pointing signs and constructions with object omission. Moreover, I analyzed the five

specialized constructions within the FDG framework and found that NGT possesses all three reflexive types proposed by Giomi (2021), showing that his model of reflexivity can successfully account for sign language data and that sign languages are as rich and complex as spoken languages. Furthermore, reflexivity seems to be a salient phenomenon, since the sheer use of space to encode referentiality in sign languages would suffice to unambiguously express co-reference between two or more arguments but specialized reflexive constructions seem to be widespread among sign languages, including NGT. Moreover, NGT reflexives seem to also be closely linked to non-reflexive phenomena such as intensification, possession and anticausativization, as has often been reported for spoken and sign languages alike. Future research is, however, needed to determine EIGEN's status as a reflexive marker and probe whether the use of object omission for the expression of reflexivity is determined by discursive constraints.

Annexes

Annex 1 – verbs attested in the reflexive constructions analyzed in this study, their count and strategies with which they occurred.

Predicate	**Count**	**Strategies**
DEVELOP	16	Omission (8), Reflexivized agreement (4), ZELF (3), EIGEN (1),
SEE	7	ZELF (2), Pronominal pointing sign (2), ZELF + pronominal pointing sign (1), Omission (1), Reflexivized agreement + pronominal pointing sign (1)
ADAPT	5	Omission (5)
DRESS	3	Omission (2), ZELF (1)
FEEL	3	ZELF (2), ZELF + pronominal pointing sign (1)
FILM	3	Reflexivized agreement (2), Reflexivized agreement + pronominal pointing sign (1)
UNDRESS	3	Omission (3)
EXPRESS	2	Omission (2)
PREPARE	2	ZELF (2)
SHAME	2	Omission (1), ZELF (1)
SHOWER	2	Omission (2)
TAKE-CARE	2	ZELF (1), ZELF + pronominal pointing sign (1)
CONTROL	1	Omission (1)
HIDE	1	Omission (1)
MANAGE	1	ZELF (1)
SCRATCH	1	Omission (1)
TEACH	1	Pronominal pointing sign (1)

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