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Iconicity as a mediator between verb semantics and morphosyntactic structure

A corpus-based study on verbs in German Sign Language

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Iconicity as a mediator between verb semantics and morphosyntactic structure

A corpus-based study on verbs in German Sign Language

In many sign languages around the world, some verbs can express grammatical agreement with not just one but two arguments, while other verbs do not express agreement at all. Moreover, and rather curiously, there is a remarkable degree of semantic overlap across sign languages between verbs that possess agreement properties. It has been suggested that iconicity has some part to play in this: in sign languages, there is the potential for aspects of verb meaning to be iconically represented in a verb's form.

In this dissertation, I investigate how semantics and morphosyntactic structure interact in constructions containing verbs with varying agreement properties in German Sign Language (DGS), using naturalistic dialogues between signers from the DGS Corpus as the primary data source.

I show that certain semantic properties – also known to govern transitivity marking in spoken languages – are predictive of verb type in DGS, where indeed systematic iconic mappings play a mediating role. The results enable the formulation of cross-linguistic predictions about the interplay between verb semantics and verb type in sign languages.

A subsequent analysis of a range of morphosyntactic properties of different verb types leads up to the conclusion that even 'plain' verbs, in fact, grammatically agree with their arguments. This in turn motivates a unified syntactic analysis in terms of agreement of constructions with verbs that do and do not overtly express it, thus presenting a novel solution to the typological puzzle that supposedly only verbs of a (partially) semantically definable subset agree in DGS and other sign languages.

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Marloes Oomen

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Structure

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ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
Prof. Dr. Ir. K.I.J. Maex

ten overstaan van een door het College voor Promoties ingestelde
commissie, in het openbaar te verdedigen
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Faculteit der Geesteswetenschappen



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Author contributions

For all chapters, Marloes Oomen was the principal investigator responsible for formulating hypotheses specific for the dissertation project, data annotation, data analysis, writing, and revision, based on feedback from Roland Pfau, Enoch O. Aboh, and Vadim Kimmelman. Marloes Oomen was also responsible for designing two small elicitation tasks and subsequently collecting data with two DGS informants. The following exceptions/additions apply:

- (i) Sections 1.2.2 and 1.2.5 in Chapter 1 previously appeared in slightly different form in Oomen, M. & Kimmelman, V. (2019). Body-anchored verbs and argument omission in two sign languages. *Glossa: A Journal of General Linguistics* 4(1): 42. The text was written jointly.
- (ii) The protocol for annotating the corpus data analyzed in this dissertation, described in Chapter 2, was first drafted by Vadim Kimmelman and subsequently revised based on discussions with the five members of the project “Argument structure in three sign languages: typological and theoretical aspects”, namely Enoch O. Aboh, Vadim Kimmelman, Vanja de Lint, Marloes Oomen, and Roland Pfau. For the specific purposes of the research presented in this dissertation, Marloes Oomen expanded the annotations with several annotation tiers, in particular four tiers including information about the modification properties of verb tokens and one tier specifying various properties of the subject in the annotated clauses.
- (iii) A version of Chapter 3 has been published as Oomen, M. (2018). Verb types and semantic maps. In V. Kimmelman & H. Koulidobrova (Eds.), *FEAST Proceedings* (Vol. 2, pp. 116-132).
- (iv) Section 7.6 presents a statistical analysis which builds on a statistical analysis of data from German Sign Language and Russian Sign Language, originally carried out by Vadim Kimmelman and reported on in Oomen, M. & Kimmelman, V. (2019). Body-anchored verbs and argument omission in

two sign languages. *Glossa: A Journal of General Linguistics* 4(1): 42. With help from Vadim Kimmelman, Marloes Oomen adapted the code for the statistical analysis in Section 7.6 from the original code written by Vadim Kimmelman.

- (v) Section 8.2.1 is an adaptation of part of Oomen, M. & Kimmelman, V. (2019). Body-anchored verbs and argument omission in two sign languages. *Glossa: A Journal of General Linguistics* 4(1): 42. The hypothesis investigated both in Section 8.2.1 and the published article was developed by Marloes Oomen. The formal analysis presented in the section and in the article was developed jointly by both authors. The text in the article was written jointly; the text in Section 8.2.1 was revised by Marloes Oomen to fit the purposes of the dissertation.

Roland Pfau, Vadim Kimmelman, and Enoch O. Aboh wrote the original project proposal that determined the overarching theme and the general research questions underlying the research presented in this dissertation. Roland Pfau acted as daily supervisor and provided feedback on all stages of the investigation. Enoch O. Aboh and Vadim Kimmelman also acted as supervisors and provided feedback on all stages of the investigation.

Notation conventions

Signs are represented in the form of glosses in small capitals. These glosses do not provide any information about the phonological form of signs, nor do they indicate whether signs are one- or two-handed.

Manual signs are glossed linearly, while non-manual elements are represented as abbreviations on a line above the manual glosses, indicating their scope. Only non-manual elements that are directly relevant to the example or that are necessary for the interpretation of the sentence (e.g. in the case of a headshake for negation) are represented.

All conventions used in this dissertation are listed below. An example sentence from the corpus illustrating some of most commonly used glossing conventions is represented in (i). Glossed examples in the text that are reproduced from other works are adapted, if necessary, to conform to the glossing conventions below.

- (i) $\overline{\text{INDEX}_a \text{ SEE}}^{\text{hs}} \backslash \text{ REASON BE-SAD INDEX}_a \text{ PU}$
'She didn't see it because she was sad.'

Manual signs:

- | | |
|-----------|--|
| SIGN | Manual signs are glossed in small capital letters in English words most closely approximating their meaning. |
| SIGN++ | Reduplication of a sign, e.g. to express plurality, is indicated by a plus symbol. Each symbol represents a reduplication cycle. |
| SIGN-SIGN | If several words are required to gloss a single sign, these words are connected by a hyphen, as in e.g. LET-KNOW. |
| SIGN..... | Indicates that the final configuration of a sign is held while the other hand continues signing. |

- dh: / ndh: In examples in which at least one one-handed sign is articulated by the signer's non-dominant hand (ndh), while the other signs are articulated with the dominant hand (dh), the glosses for manual signs are represented on two lines preceded by 'dh:' and 'ndh:'.
- CL(x):XXX Classifiers and classifier predicates are indicated with the gloss CL, followed by a handshape specification in between brackets, e.g. (☞), and a description of the meaning of the classifier or classifier predicate.
- INDEX_x Pointing signs are represented with the gloss INDEX followed by a subscript, which indicates a particular location in the signing space. '1' refers to a location on or close to the signer's body; '2' refers to the location of the addressee; letter subscripts ('a'; 'b') abstractly represent other locations in the signing space. When there are multiple pointing signs within a single example, the first INDEX is followed by the subscript 'a', the second by 'b', etc.
- POSS_x A possessive pronoun, articulated with a ☞-handshape at the locus indicated by the subscript.
- VERB_x Verb whose place of articulation aligns with a location in the signing space, associated with a referent or location, to express agreement. The subscript specifies the location according to the principles explained with INDEX_x above. Occasionally, the subscript 'c' is used to highlight that a verb is articulated at the center of the signing space.
- VERB_(x) Verb whose place of articulation aligns with a location in the signing space associated with a referent or location, where the alignment might be a phonological coincidence rather than an expression of agreement.
- VERB_{x*} Verb with a place of articulation on the signer's left or right that does not correspond to a location in the signing space previously associated with a referent or location.
- _xVERB_y Verb that moves from one location to another. The subscript specifies the location according to the principles explained with INDEX_x above. The subscript types (x) and x* (see above) are also used.

PU	Palm-up sign, a particle with a variety of discourse-related functions.
S-I-G-N	Fingerspelled words are glossed as individual letters separated by hyphens.
\	A clause boundary or a clear prosodic boundary to signal e.g. topicalization.

Non-manual elements:

<u>hn</u>	Head nod, e.g. for affirmation.
<u>hs</u>	Headshake, to express negation.
<u>re</u>	Raised eyebrows, e.g. to mark different types of subordinate clauses or topicalized constituents.
<u>fr</u>	Frowning of the eyebrows, e.g. to express uncertainty.
<u>rs</u>	Role-shift markers; typically a combination of body lean, change in direction of eye gaze, change in facial expressions.
<u>'word'</u>	Mouthing of a German word.

List of sign languages

All sign languages mentioned in this dissertation are included in the table below. Sign languages that are referred to more than once in a chapter are abbreviated by the most commonly employed acronym in the literature, which is sometimes based on the language's name in English (e.g. RSL for Russian Sign Language), and sometimes on its name in the local spoken language (e.g. DGS for *Deutsche Gebärdensprache*; German Sign Language).

Sign Language	Abbreviation
Al-Sayyid Bedouin Sign Language	ABSL
American Sign Language	ASL
Australian Sign Language	Auslan
Brazilian Sign Language (<i>Língua Brasileira de Sinais</i>)	Libras
British Sign Language	BSL
Catalan Sign Language (<i>Llengua de Signes Catalana</i>)	LSC
Croatian Sign Language	-
Danish Sign Language (<i>Dansk Tegnsprog</i>)	DTS
German Sign Language (<i>Deutsche Gebärdensprache</i>)	DGS
Finnish Sign Language	-
Flemish Sign Language	-
Hong Kong Sign Language	HKSL
Inuit Sign Language	-
Irish Sign Language	-
Israeli Sign Language	ISL

Continued on next page

Continued from previous page

Sign Language	Abbreviation
Italian Sign Language (<i>Lingua dei Segni Italiana</i>)	LIS
Japanese Sign Language	-
Kata Kolok	-
New Zealand Sign Language	NZSL
Russian Sign Language	RSL
Sign Language of the Netherlands (<i>Nederlandse Gebarentaal</i>)	NGT
Spanish Sign Language (<i>Lengua de Signos Española</i>)	LSE
Swedish Sign Language	-
Turkish Sign Language (<i>Türk İşaret Dili</i>)	TİD

CHAPTER 1

Introduction

ALMOST all sign languages that have been investigated include a subset of verbs that can mark their arguments by modifying their path movement in space, such that it starts at the locus associated with the subject (for instance, the signer), and ends at the locus associated with the object (for instance, an individual who has previously been assigned a location on the right side of the signer by means of a pointing sign). These verbs are called agreeing / agreement or indicating verbs, depending on one's theoretical approach.¹ However, many other verbs cannot be modified in this way: some have a fixed articulation on the body, while others are articulated in front of the signer but lack the path movement that characterizes agreeing verbs. These types of verbs are often claimed not to possess agreement properties. In addition, there are verbs – generally referred to as spatial verbs – which, like agreeing verbs, have a path movement but agree with locations instead of referents.

Interestingly, it appears that verb type membership is at least partially semantically grounded. For instance, a verb such as 'answer' is more likely to be realized as an agreeing verb than a verb like 'feel', because the former involves two participants and a form of (metaphorical) transfer between them, which is reflected by the path movement. The latter verb, on the other hand, is more likely to be articulated on the signer's body as a way of reflecting a body-internal experience.

The verb type system in sign languages has intrigued many sign linguists over the years, with agreeing verbs in particular having received much attention. A number of key questions are central to this intense research interest. For instance, how come that only a subset of verbs may express agreement – and not just with one, but with two arguments? What is the precise relation between a verb's semantics and its agreement properties? Why do so many sign languages share the same tripartite verb classification? And should the mechanism by which agreeing verbs mark their arguments, i.e. through modification of their path movement, be analyzed as proper grammatical agreement?

This dissertation attempts to provide answers to all of these questions for one particular sign language, namely German Sign Language (DGS). While not being the first work to do so, this work differs from many others within this realm of research in that it devotes almost equal attention to the different verb types. A benefit of this approach is that verb types can be compared more directly, which eventually leads to an integrative theoretical analysis, couched within Generative Grammar, that accounts for the syntactic structure of constructions with different

¹In this dissertation, I refer to these verbs as 'agreeing verbs'.

verb types in a single unified model.

An important theme throughout this dissertation is the interplay between iconicity (direct form-to-meaning mappings) and lexicon and grammar. I already pointed out above that the verb type system in sign languages is at least partially semantically grounded – and it appears that this may, to some extent, be attributed to iconicity. Indeed, I will argue that the data provide evidence that iconicity effects reach all the way into the grammar of DGS. Crucially, however, I show that such iconically-motivated properties do not need to be considered non-linguistic, showing instead that they can be accounted for in formal terms without having to appeal to iconicity in the formal structure itself.

This chapter sets the stage for the rest of the dissertation by introducing the relevant background information and concepts, as well as outlining the main research questions that motivated the investigation. The chapter is organized as follows. In Section 1.1, I concisely describe the key developments in the field of sign language linguistics from its inception to the present, focusing especially on those subdisciplines relevant to the present dissertation. Section 1.2 presents a description of the linguistic properties important within the context of this dissertation that are recurrently found across sign languages. Section 1.3 discusses some historical and sociolinguistic facts about DGS, and presents some general linguistic information about the language insofar as this has not been introduced previously in Section 1.2. The research in this dissertation is primarily based on the analysis of naturalistic data from the DGS Corpus (<https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>); in Section 1.4, I discuss the advantages and limitations of such corpus-based research. This dissertation forms part of a larger NWO-funded project on argument structure in three sign languages, namely DGS, Russian Sign Language (RSL), and Sign Language of the Netherlands (NGT). Dr. Roland Pfau and Prof. Dr. Enoch Aboh are the PIs, and Dr. Vadim Kimmelman (RSL) and Vanja de Lint (NGT), in addition to myself, are the primary investigative executors. Further details of the project are described in Section 1.5. The goals of this dissertation are presented in Section 1.6; Section 1.7 presents the outline for the rest of the book.

1.1 The study of sign languages

Sign languages are full-fledged natural languages used primarily by deaf people in everyday communication. Like spoken languages, sign languages are acquired

naturally by children. Whereas in spoken languages, perception and production are rooted in the oral-auditory modality, sign languages use the manual-visual modality to transmit and receive linguistic messages. Although sign languages have a much stronger iconic component than spoken languages, there is not one universal or international sign language: different sign languages differ in their lexicon and grammatical rules. The online reference work *ethnologue.com*, which provides information and statistics for all known languages around the world, currently lists 144 different sign languages. However, the total number of sign languages is likely to be higher, since not all sign languages presently being used around the world may have been discovered yet.

Although growing steadily, sign language linguistics is a relatively young and small research field compared to the study of spoken languages. The field saw its inception with the pioneering works by Tervoort (1953) and Stokoe (1960/2005), who were the first to suggest that sign languages are natural languages with the same level of complexity as spoken languages. Following these publications, other sign linguists soon started to investigate the grammatical properties of sign languages further.

This early period of sign language linguistics coincided with a proliferation of research in the generative tradition, initiated by Noam Chomsky with his book *Syntactic structures* (Chomsky, 1957). Generative Grammar operates on the hypothesis that humans have an innate language faculty consisting in a set of syntactic rules – a Universal Grammar – which allows children to acquire a language, in all its complexity, without explicit instruction or even exhaustive language input.

If such a Universal Grammar exists, then one should be able to find evidence for it in all human languages – independent of the modality of transmission. As such, many sign linguists working in the 1960s and 1970s strived to identify linguistic properties that languages of the two modalities share. Since, at the time, the status of sign languages as natural languages was – at least to the non-expert – still a matter of debate, this early period of sign language was characterized by a general tendency for sign linguists to downplay the impact of any properties that appeared specific to sign languages (McBurney, 2001, 2012; Vermeerbergen, 2006).

From the 1980s onward, and once the natural status of sign languages had become less contested, a shift occurred toward research focusing on how sign languages differ from spoken languages (McBurney, 2012; Vermeerbergen, 2006).

These differences are just as interesting as the similarities, as they shed light on which aspects of language, being attested only in signed or spoken languages, appear to be shaped by modality. Modality-specific (or modality-favored) properties, such as e.g. use of space, iconicity (see Section 1.2.7), and simultaneity in sign languages, may also be useful for another reason: they can be used as tools to learn more about the underlying structure of language(s).

More recently, aided by the steady expansion of the field and the increased number of sign languages under active investigation, linguists have started comparing sign languages to each other. The primary aim of sign language typology is to deepen our understanding of the common characteristics as well as structural diversity both among sign languages and across signed and spoken languages. Although sign languages are often said to be more alike to one another than spoken languages, typological studies have demonstrated that there is nonetheless significant variation in various linguistic domains (see e.g. the contributions in Perniss, Pfau, & Steinbach, 2007).

Regarding methodology and data collection, many sign language studies are based on data from just a couple of informants per study. This is partially due to the difficulty of finding signers who would be considered 'native'. This label is usually reserved for deaf children of deaf parents, and they form only a fraction of all deaf individuals (5-10% is the usual estimate) – who only make up about 0.1% of the population in most (Western) countries. However, it was – and still is – not at all uncommon for spoken language studies in the generative tradition to be based on intuitions from just one or maybe a few speakers either. The assumption that underlies this method is that native speakers of a language intuitively know what is and what is not grammatical in a language, fitting with the view that language is at least partially innate.

Yet new methods are on the rise. Technological advances have facilitated the creation of sign language corpora that contain relatively large quantities of spontaneous or semi-spontaneous data; several such corpora have now been made publicly accessible, including the DGS Corpus.² This development has opened up an entirely new field of research possibilities, although there are also challenges; in Section 1.4, the benefits and drawbacks of corpus-based research on (sign) languages are discussed in more depth.

²It should, however, be noted that the existing sign language corpora are still extremely small compared to many text corpora available for various (generally well-researched) spoken languages.

In the next section, I discuss some important outcomes of the past several decades of sign language research, focusing specifically on those aspects of sign language structure that are relevant to the general topics of this book. Wherever possible, I discuss previous work on the properties discussed that focused specifically on DGS.

1.2 Grammatical properties of sign languages

Although every sign language has its own grammatical structure, there are also many properties that are shared across sign languages. Such similarities may reflect modality effects, but there are other possible explanations. For instance, if a particular property is also attested in spoken languages, it may represent a language universal.³ Another possibility is that the age of sign languages is connected with the degree of similarity among them. That is, all sign languages that we know of are relatively young, with Woll, Sutton-Spence, and Frances (2001) reporting that there are no known sign languages older than 300 years – and many are even much younger than that. Indeed, sign languages are known to display striking similarities to young creole languages, in particular in their course of development and acquisition. In addition, there are also commonalities in language structure, such as in the common presence of rich aspectual systems, the frequent lack of prepositions to introduce oblique cases, and a general heavy reliance on prosodic cues for expressing particular syntactic relations, among other characteristics (Aronoff, Meir, & Sandler, 2005; Fischer, 1978; Gee & Goodhart, 1988).⁴ Thus, in the discussion of the properties of sign language structure below, one should bear in mind that there are a number of potential explanations for shared similarities; where relevant, this will be discussed.

Section 1.2.1 introduces some general properties of sign languages at various levels of linguistic structure. The subsequent sections discuss various topics relevant to the themes discussed in this book, including person marking (Section 1.2.2), verb classification (Section 1.2.3), agreement auxiliaries (Section 1.2.4), null arguments (Section 1.2.5), and iconicity (Section 1.2.7).

³One should always take caution that potentially universal properties are not obscured by modality-specific properties; that is, even if a particular linguistic property looks different in signed and spoken languages, it might be the case that it is actually underlyingly the same.

⁴However, sign languages are also known to have relatively complex simultaneous morphology, which Aronoff et al. (2005) claim is iconically based.

1.2.1 General properties

The basic building blocks of signs were first described by Stokoe (1960/2005) in his seminal work on American Sign Language (ASL). Stokoe (1960/2005) argues that signs are not holistic elements but – just like words in spoken languages – are made up of smaller, contrastive, meaningless units. Stokoe (1960/2005) identifies these elements as specifications for (i) handshape, (ii) location, and (iii) movement (or motion); these parameters are still conventionally recognized as the main phonological building blocks of signs. Some linguists (e.g. Battison, 1978) have claimed that hand orientation should also be considered a major category, while others (e.g. Brentari, 1998) have argued that non-manuals form an additional major parameter.⁵

Significantly, a change in specification for one of these parameters may lead to a change in the overall meaning of the sign. This is similar to how the change of a single phoneme in spoken language may change the overall meaning of a word. The observation that sign languages, like spoken languages, possess such minimal pairs was taken as a key argument in favor of the view that sign languages are natural languages in Stokoe (1960/2005), since it demonstrates that sign languages involve duality of patterning (Hockett, 1959).

Sign languages do not just employ the hands in conveying linguistic meaning: non-manuals, expressed by the face and body, are a crucial component of sign language utterances. Non-manuals may express a variety of lexical, syntactic, discourse, and affective functions (see Pfau & Quer, 2010, for an overview). Here, I highlight a few uses of non-manuals that are relevant in the context of this dissertation.

Firstly, non-manual components can be lexically specified, i.e. they form part of the lexical entry of a sign. Mouthings (mouthed words from spoken language) and mouth actions (mouth patterns not derived from spoken language) are known to occur in many sign languages (see e.g. the edited volume by Boyes Braem and Sutton-Spence, 2001, for descriptions of mouth patterns in nine sign languages), but there are other options. For instance, Pendzich (2017) shows for DGS that head or torso actions, as well as muscle contractions in the upper face, can be lexically specified in certain signs. Mouthings may sometimes distinguish the part-

⁵Some subsume handshape and orientation under the single major category 'hand configuration' (e.g. Sandler, 1989; Sandler & Lillo-Martin, 2006; van der Hulst, 1996, 1-3), or claim that orientation is derivable from a combination of handshape and location (e.g. Brentari, 1998; Crasborn & van der Kooij, 1997).

of-speech of a particular sign: many signs may function both as a verb or a noun, or a verb and an adjective, in which case a mouthed word from spoken language can sometimes distinguish between categories.

Lexical uses of non-manuals need to be distinguished from grammatical uses, which are also frequently attested. An example of a grammatical non-manual is a headshake for negation in languages where this non-manual may spread beyond the manual negator, on which it is probably lexically specified (Zeshan, 2004a). It has been shown for a variety of languages in which the headshake may spread that the spreading domain is subject to language-specific constraints; in DGS, for instance, the headshake usually accompanies the verb (Pfau, 2008). Sign languages also typically use non-manual markers to signal e.g. interrogatives (Zeshan, 2004b, presents a typological overview) or conditional clauses (e.g. Dachkovsky, 2008; Klomp, 2019; Liddell, 1986).

Another phenomenon involving non-manual markers which merits introduction is role shift. Role shift is a grammatical means to trigger a context shift in which a signer comes to convey the point of view of a referent by expressing that referent's thoughts, speech / signing, or actions (Herrmann & Steinbach, 2012; Lillo-Martin, 2012). Generally, linguists distinguish between quotative role shift (constructed dialogue), and non-quotative role shift (constructed action). The non-manual markers used are the same and typically involve (a combination of) a body lean toward the locus of the referent, affective facial expressions representing that of the referent shifted into, and a change in the direction of eye gaze (Herrmann & Steinbach, 2012; Padden, 1986). Quotative role shift may additionally involve the use of first-person pointing signs to refer to the quoted referent, which is sometimes referred to as 'referential shift' (Engberg-Pedersen, 1993).

A final topic I wish to touch upon here is that of basic constituent order. As in spoken languages (Dryer, 2013), the most commonly attested orders in sign languages are SOV and SVO (Leeson & Saeed, 2012; Meir et al., 2017; Napoli & Sutton-Spence, 2014). Napoli and Sutton-Spence (2014) argue that the preference displayed by sign languages for SOV and/or SVO order is partially a modality effect. An important insight in support of this view is that many sign languages have been reported to show a dichotomy between verbs that express agreement – crucially, through the application of the modality-specific use of space – and verbs that do not (see Section 1.2.3): the former tend to occur in SOV constructions, while the latter have a preference for SVO. Meir et al. (2017) show that in young sign languages, as well as in invented gesture systems, constructions with

two human event participants display more variation than constructions with one human and one inanimate participant. The latter tend to consistently display SOV order. Meir et al. (2017) argue that the variability in constituent order in clauses with two human arguments reflects a tendency to introduce salient entities before less salient ones. Since human entities are generally more salient than inanimate ones, there is more competition in clauses with two human entities, thus giving rise to variation in constituent order.

DGS has generally been claimed to have basic SOV order (Bross & Hole, 2017; Happ & Vorköper, 2006; Herrmann, 2013; Keller, 1998; Pfau & Glück, 2000; Steinbach & Herrmann, 2013), although Rathmann (2003) has argued that DGS does not have a fixed order. Topic constructions are also common in DGS, with topicalization occurring frequently (Herrmann, 2013).

1.2.2 Person marking

Sign languages may exploit space to express both actual and metaphorical spatial relations.⁶ One of the ways in which space is exploited in most sign languages that we know of, is by using locations in the signing space for pronominal reference (see Cormier, 2012, for a recent overview of the relevant literature). In this system, referents become associated with particular locations in space (R-loci) for the duration of a discourse (Lillo-Martin & Meier, 2011). There are several means to set up such R-loci, but the most straightforward strategy is to use a pointing sign to localize a (present or absent) referent. A DGS example from Steinbach and Onea (2016, p. 413) is presented in (1). The noun phrase *NEW TEACHER* is followed by a pointing sign which localizes this referent; the subscript 'a' abstractly represents this location in the glosses.⁷

- (1) INDEX₁ NEW TEACHER INDEX_a LIKE [DGS]
'I like the new teacher.'

In the case of absent referents, R-loci are abstract locations in the signing space. This means that third-person pronouns do not have a fixed form, given that their place of articulation may differ depending on where their corresponding referents are localized within the context of a discourse. The latter also holds

⁶A version of this section has previously been published in Oomen and Kimmelman (2019).

⁷See Notation conventions for the glossing conventions used in this dissertation.

for present second- and third-person referents, who can in principle be located in just as many different loci relative to the signer. Conversely, any reference that is made to an R-locus within a particular discourse picks out a specific referent, rather than the pool of all possible available referents in a discourse. This behavior is different from that of a typical third-person pronoun in spoken languages. A pronoun such as ‘he’ in English, for instance, ambiguously refers to any male third-person referent available in the discourse.

First-person pronouns, on the other hand, are consistently articulated on the signer’s body, typically on the chest.⁸ As such, some researchers have proposed that sign languages make a first person vs. non-first person distinction rather than a three-way distinction (e.g., Hou & Meier, 2018; Meier, 1990). Although I arrive at the same conclusion in Chapter 8, in the corpus examples displayed throughout this dissertation, I will use the gloss INDEX₂ to refer to pointing signs toward the addressee, and INDEX followed by a letter subscript (‘a’; ‘b’) to refer to third-person referents.

Because of the specific properties of the referential system described above, some sign linguists (e.g. Costello, 2015; Keller, 1998; Steinbach & Onea, 2016) have argued or implied that ‘person’ is not a grammatical category in sign languages. Keller (1998), for instance, argues that pronouns in DGS have place features instead of person features. Since verbs that may express agreement also exploit R-loci (see the next section), characterizing the precise nature of the referential system in DGS is an important subgoal of this dissertation. See Chapter 8.2.1.2, in particular, for further theoretical discussion.

1.2.3 Verb classification

Lexical verbs in sign languages are traditionally divided over three classes based on their agreement properties (Padden, 1988). The verb types that are typically distinguished are (i) agreeing (or agreement) verbs, (ii) spatial verbs, and (iii) plain verbs. Since the properties of the different verb types are discussed in detail in Chapters 4 to 6, I aim to keep the discussion in this section as brief as possible, introducing some basic properties of the different verb types and a number of key research questions that debates in the literature have centered on in this domain.

⁸There are some exceptions. In Japanese Sign Language, for instance, first-person pronouns are articulated on the nose (McBurney, 2002). Still, the main point is that the expression of first person is always associated with the signer.

The verb type that has received the most research interest by far is that of agreeing verbs. As the name suggests, these verbs may express what is commonly analyzed as agreement marking.⁹ They do so by using locations in the signing space. As described in the previous section, referents are assigned R-loci, which can be referred back to by pronominal pointing signs – but they may also be utilized by agreeing verbs to express agreement. In their citation form, prototypical agreeing verbs have a path movement from a place directly in front of the signer to a location further away from the signer; when a verb token expresses agreement, this movement is modified such that the initial place of articulation matches the locus of the subject, while the final place of articulation aligns with the object locus. An example of a modified agreeing verb is shown in Figure 1.1.



Figure 1.1: A token of the agreeing verb ASK with a path movement from the subject (a first-person referent) to the object (a third-person referent) of the verb; video stills from DGS Corpus.

Spatial verbs are similar to agreeing verbs in that they also involve a path movement, but they differ in that they display locative rather than referential agreement. An example of a spatial verb is depicted in Figure 1.2. Since the morphosyntactic mechanism that agreeing and spatial verbs employ appears to be the same, much of the debate around these verbs has centered on whether or not they should be considered separate verb classes or not (see e.g. de Quadros & Quer, 2008; Janis, 1992). Agreeing verbs and spatial verbs are extensively discussed and analyzed in Chapter 6.

Finally, plain verbs are verbs that cannot be spatially modified in the way de-

⁹As I discuss in further detail in Chapter 6.1, not everyone agrees that this mechanism constitutes agreement, with some suggesting that agreeing verbs indicate rather than agree with their arguments. Linguists of the latter theoretical persuasion therefore tend to refer to agreeing verbs as ‘indicating verbs’.



Figure 1.2: A token of the spatial verb GO1 with a path movement from one location to another; video stills from DGS Corpus.

scribed above, and they have therefore been claimed not to express agreement. Plain verbs tend to be body-anchored verbs, as these forms resist modification due to their fixed place of articulation on the body. Figure 1.3 presents an example of a body-anchored verb; Chapter 4 extensively discusses verbs of this type.



Figure 1.3: A token of the body-anchored verb LOVE(-SOMETHING) with a fixed place of articulation on the body; video still from DGS Corpus.

There appear to be different views as to whether that are verbs articulated at or close to the center of the signing space in their citation form, which I will call ‘neutral verbs’, should be considered plain or not (see e.g. Costello, 2015; Keller, 1998; Lourenço, 2018; Padden, 1990). Figure 1.4 shows an example of a neutral verb. For a number of sign languages, it has been described that neutral verbs may be modified to align with the R-locus of a referent, leading some (e.g. Bos, 1993; Costello, 2015; Fischer & Gough, 1978; Lourenço, 2018) to conclude that such verbs express agreement with a single argument. Others (e.g. Keller, 1998; Padden, 1990) have claimed that this type of localization is actually a form of

pronominal cliticization or affixation rather than agreement. Chapter 5 discusses the properties of neutral verbs in detail.

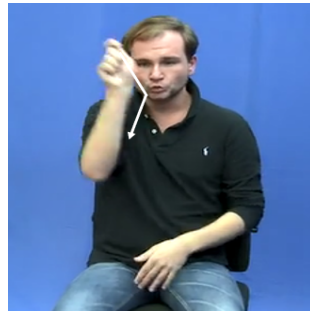


Figure 1.4: A token of the neutral verb *STUDY* articulated close to the center of the signing space (on the vertical plane); video still from DGS Corpus.

The particularities of the verb classification system have fuelled much theoretical debate over the years. Sign linguists have wondered, for instance, why only a subset of verbs express (double) agreement, while other verbs do not. Indeed, it has been remarked that semantics must play some role in the matter. Meir (1998, 2002), for instance, claims that agreeing verbs express concepts of transfer. However, others have since pointed out that the notion of transfer, unless considered in the most abstract terms, cannot be applied to *all* agreeing verbs (e.g. Bos, 1998/2017; Costello, 2015; Pfau, Salzmann, & Steinbach, 2018; Steinbach, 2011).

Then there are verbs that do not neatly fall into one of the basic classes, but appear to fall somewhere in between, such as verbs with a fixed initial place of articulation on the body but a modifiable final place of articulation in the signing space, which may align with an R-locus (Meir, Padden, Aronoff, & Sandler, 2007). Other verbs typically behave like spatial verbs yet may sometimes display behavior that is more characteristic of agreeing verbs (de Quadros & Quer, 2008). And then there are so-called 'backward verbs', which are agreeing verbs that display a reverse path movement from the R-locus of the object referent to the R-locus of the subject referent (Friedman, 1975). All these issues are addressed at various points in this dissertation.

DGS is reported to have the same basic types of verbs as other sign languages (Happ & Vorköper, 2006; Keller, 1998, among others). Keller (1998) presents the most thorough investigation of verb classes in DGS, and proposes that many verbs involve pronominal affixation, phonologically realized as locations in the signing

space. This does not only apply to neutral verbs, as noted above, but also to agreeing and spatial verbs. Keller (1998) argues that only verbs that are lexically specified for place of articulation, such as body-anchored verbs, do not involve affixation, since they are phonologically constrained from doing so.

Finally, let me also briefly discuss classifier predicates here. Since the research presented in this book focuses on the investigation of lexical verbs and their classification in DGS, classifier predicates – which are non-conventionalized signs – are excluded from the analysis. However, since classifier predicates are ubiquitous in sign languages, including DGS, they merit a brief introduction.

Classifier predicates are morphologically complex signs that combine a morphemic, iconically motivated, handshape specifying a class of objects (e.g. an upright animate entity or a flat object) with a movement depicting the sort of movement the classified entity makes in space (see e.g. Emmorey, 2003; Supalla, 1986; Zwitserlood, 2012). Some examples are presented in Figure 1.5. Benedicto and Brentari (2004) show for ASL that classifier handshapes are morphemes that determine argument structure: handling classifiers (Figure 1.5a) behave like transitives, whole-entity classifiers (Figure 1.5b) like unaccusatives, and body-part classifiers (Figure 1.5c) like unergatives. Although the exact details sometimes differ, similar relations between classifier and argument structure have been described for a variety of other sign languages (see e.g. de Lint, 2018; Ferrara, 2012; Glück & Pfau, 1998; Pavlič, 2016).¹⁰

Although classifier predicates are not investigated in detail in this dissertation, 299 clauses containing such predicates were annotated in the DGS corpus data for potential future studies; see Chapter 2.3 for details on the annotation procedure. In Chapter 3.5.5, I take a brief look at the semantics of classifier predicates in order to establish how their semantic profile relates to that of other verb types. After this chapter, classifier predicates are not paid any further attention – although I will argue in Chapter 8.1 that spatial verbs share some key characteristics with classifier predicates.

¹⁰However, Kimmelman, Pfau, and Aboh (2019) and Kimmelman, de Lint, et al. (2019) – both studies published within the context of the wider project that this dissertation forms a part of – report systematic exceptions to the patterns described by Benedicto and Brentari (2004) in four different sign languages; see 1.5 for further details.

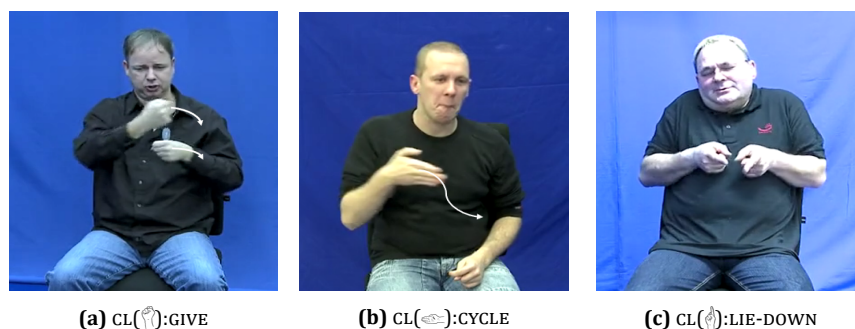


Figure 1.5: Three examples of classifier predicates. (a) A handling classifier representing hands holding a flower bouquet; (b) a whole-entity classifier representing a bike; (c) a body-part classifier representing two legs. Video stills from DGS Corpus.

1.2.4 Agreement auxiliaries

Many sign languages make use of one or several auxiliaries (see Sapountzaki, 2012; Steinbach & Pfau, 2007, for overviews). Many of these auxiliaries have in common that – unlike auxiliaries in spoken languages – they do not encode tense, aspect, or modality, but rather have the sole purpose of expressing agreement. They often do so in the same way as agreeing verbs, i.e. by modifying their path movement. Agreement auxiliaries tend to combine with plain verbs, as these cannot express agreement marking by themselves (Sapountzaki, 2012; Steinbach & Pfau, 2007). Agreement auxiliaries may grammaticalize from indexical pronominals, verbs such as GIVE or GO-TO, or nouns like PERSON (Steinbach & Pfau, 2007).

Some sign languages (also) have auxiliaries with a more specific function than only marking agreement; these tend to combine more restrictively with particular subsets of verbs. Israeli Sign Language (Meir, 1998), Catalan Sign Language (LSC; Quer, 2009), Spanish Sign Language (Costello, 2015), and Greek Sign Language (Sapountzaki, 2012), for instance, each have an auxiliary-like sign that occurs mostly or exclusively with psych-verbs to trigger a causative interpretation. In all cases, the auxiliary is derived from the lexical verb GIVE.

DGS also has an agreement auxiliary, which is commonly referred to as person agreement marker (PAM) and which is derived from the sign for PERSON (Rathmann, 2003). As in other sign languages, PAM has been claimed by Rathmann (2003) to express agreement with the subject and object in clauses containing verbs that cannot express agreement themselves. An example of a sentence with PAM is presented in (2) (reproduced from Rathmann, 2003, p. 182).

- (2) HANS_a PAM_b MARIE_b LIKE [DGS]
 ‘Hans likes Marie.’

Rathmann (2003) additionally claims that PAM may be inserted for pragmatic reasons, namely to force an episodic reading (e.g. ‘A mother has been teaching her son for five years.’). Under this use, it is possible for PAM to combine with verbs that are able to express agreement.

Other researchers have since affirmed the status of PAM as an agreement auxiliary (see e.g. Macht, 2016; Pfau et al., 2018; Steinbach, 2011; Steinbach & Pfau, 2007). More recently, however, Bross (2018) has argued that PAM, at least in the DGS varieties of Bavaria and Baden-Württemberg in southern Germany, is actually a preposition used as a differential object marker. Indeed, Bross (2018) claims that PAM does not express subject marking at the beginning of its path movement. A piece of evidence he presents in support of his analysis of PAM as a differential object marker is that it can still occur when the verb is nominalized, which would be unexpected if PAM were a genuine auxiliary.

As it turns out, very few clauses in my data set include the auxiliary PAM, so its properties form only a minor topic in this dissertation; Chapter 8.3.2 provides a brief discussion.

1.2.5 Null arguments

Many sign languages allow for null arguments, and over the years, varying descriptions and analyses of this phenomenon have appeared (see e.g. Bahan, Kegl, Lee, MacLaughlin, and Neidle, 2000; Koulidobrova, 2017; Lillo-Martin, 1986, 1991; Neidle, Kegl, MacLaughlin, Bahan, and Lee, 2000; Wulf, Dudis, Bayley, and Lucas, 2002 for ASL; McKee, Schembri, McKee, and Johnston, 2011 for Australian Sign Language (Auslan) and New Zealand Sign Language (NZSL); Glück and Pfau, 1998 for DGS; Bos, 1993 and Oomen, 2017 for NGT). Here, I provide a brief overview of this body of work.¹¹

Lillo-Martin (1986, 1991) argues for ASL that null arguments in constructions with both plain and agreeing verbs can be variables bound by an empty topic. Additionally, agreeing verbs (only) can license the empty category *pro* through agreement. The analysis is supported by syntactic facts such as that agreeing verbs do not require a resumptive pronoun for a subject that is left-dislocated across a

¹¹A version of this section has previously been published in Oomen and Kimmelman (2019).

wh-island (3a) but plain verbs do (3b) (examples reproduced from Lillo-Martin, 1986, p. 424-425). Bos (1993) and Glück and Pfau (1998) describe similar patterns for NGT and DGS.

- (3) a. $\frac{\text{re}}{\text{MOTHER}_a} \text{INDEX}_1 \text{ DON'T-KNOW WHAT } (\text{INDEX}_a)_a \text{ SEND}_1$ [ASL]
 'My mother_i, I don't know what she_i sent me.'
- b. $\frac{\text{re}}{\text{MOTHER}_a} \text{INDEX}_1 \text{ DON'T-KNOW WHAT } *(\text{INDEX}_a)_a \text{ LIKE}$ [ASL]
 'My mother_i, I don't know what she_i likes.'

Bahan et al. (2000) and Neidle et al. (2000) argue against such a hybrid analysis and claim that all null arguments in ASL are licensed through agreement, which can manifest itself through non-manual marking (eye gaze or head tilt) in addition to the regular manual strategies.¹² In other words, plain verbs are claimed to express agreement exclusively with non-manual means. Koulidobrova (2017), providing novel ASL data, shows that both *pro* and topic-bound variable analyses fail to account for all the morphosyntactic facts, and proposes instead that null subjects represent cases of ellipsis of a bare NP.

Each of the studies mentioned above is based on elicited or informant data. In contrast, Wulf et al. (2002) and McKee et al. (2011) analyze spontaneous narratives to study patterns of argument drop in ASL, and Auslan and NZSL, respectively. Wulf et al. (2002) focus on the behavior of plain verbs and report that just 35% of the examples in their data set include a subject pronoun. Statistical analysis shows that person, number, constructed action/dialogue (role shift), co-reference with the subject in the preceding clause, and several sociolinguistic factors all impact on a signer's choice for an overt or non-overt subject in any given clause. To single out the factors that will be shown to be relevant in the context of the present study, constructed action or dialogue is reported to correlate with a dispreference for overt pronominal subjects, while first-person singular pronouns are most frequently, and third-person singular pronouns least frequently, expressed overtly. Wulf et al. (2002) do not quantify how many of the examples with third-person referents that are not indicated by a pronominal pointing sign actually involve a null subject, and how many of them include a full NP – which, it transpires, have not been excluded from the data set. As such, the results tell

¹²However, see Thompson, Emmorey, and Kluender (2006) for experimental evidence against such an analysis. Hosemann (2011) similarly shows that eye gaze generally does not mark agreement in the absence of manual marking in DGS. In fact, verbs that are manually marked are also more likely to be non-manually marked.

us little about how often a third-person referent is or is not expressed in clauses with plain verbs.

McKee et al. (2011) report broadly overlapping results in their study of Auslan and NZSL, which is based on data acquired by using the same methods as in Wulf et al.'s (2002) investigation. McKee et al. (2011) note that what they call “partial agreement verbs” – verbs which agree spatially with an object but have a fixed starting locus on the body – more often co-occur with an overt subject than double agreement verbs in Auslan. Plain verbs are reported to slightly favor subject expression.

Finally, I myself have previously argued for NGT that psych-verbs, which are almost all body-anchored, pose a particular restriction on subject drop (Oomen, 2017). Based on an analysis of data from the Corpus NGT (Crasborn, Zwitserlood, & Ros, 2008), I showed that first-person subjects in clauses with psych-verbs are frequently null, whereas third-person null subjects hardly ever occur. I argued that the iconically motivated place of articulation of psych-verbs on the body triggers a default first-person interpretation in the absence of an overt subject, such that third-person subjects always need to be pronounced. This hypothesis is one I revisit several times in this dissertation, most notably in Chapter 4.3.3 on body-anchored verbs, where I investigate whether the same restriction holds in DGS, and in Chapter 8.2.1, which presents a theoretical account of constructions with body-anchored verbs and other verb types.

1.2.6 Agent-backgrounding

Agent-backgrounding is a relatively understudied area in sign language linguistics, although some notable exceptions include a number of studies on passives in ASL (Janzen, O’Dea, & Shaffer, 2001; Kegl, 1990), a study on DGS investigating the role of non-manuals in agent-backgrounded constructions (Hansen, 2007), several articles on impersonal reference in LSC (Barberà, 2012; Barberà & Cabredo Hofherr, 2017a, 2017b; Barberà & Quer, 2013), and the contributions to a recent special issue of *Sign Language & Linguistics*, edited by Barberà and Cabredo Hofherr (2018), which includes research on referential impersonals in six different sign languages.

Grammatically, the backgrounding of an agent may happen through passivization or by making it non-referential. Passive constructions are valency-reducing operations, unlike impersonal constructions, which “have the appearance to reg-

ular, personal, constructions but feature a subject that is human and non-referential” (Siewierska, 2011, p. 57).

A frequently employed strategy across sign languages to refer to a non-referential human subject is the use of a null subject; indeed, this strategy is attested in all six languages represented in Barberà and Cabredo Hofherr (2018). Kegl (1990) reports that null subjects also commonly occur in constructions with agent demotion in ASL. She additionally reports that in constructions with an agreeing verb, the path movement of this verb disappears. As a result, the verb ends up being articulated at the signer’s body, which Kegl (1990) argues becomes associated with the patient argument. Kegl (1990) takes these observations as evidence that constructions of this kind are actually passives having undergone detransitivization, because they display the hallmarks of true intransitive constructions.

Janzen et al. (2001) largely concur with Kegl’s (1990) conclusions, although they argue that her account is too restrictive. In addition, the authors highlight that signers may employ eye gaze to align with the patient rather than the agent argument as part of a general strategy to represent an event from the point of view of the patient.

The importance of eye gaze in agent-demoted constructions is further emphasized by Hansen (2007) for DGS, who claims that DGS is an ergative language which therefore does not have morphological passives. Yet, argument demotion can be signaled through eye gaze. Like Kegl (1990) and Janzen et al. (2001), Hansen (2007) claims that signers consistently shift into (or ‘embody’) the role of the patient when they want to signal that this argument is the most important or prominent in the sentence. As for eye gaze, the signer generally has two options: either gaze is directed downward, or it is directed toward the locus associated with the actor. Agent demotion occurs in the former but not in the latter case.

Beyond the use of null subjects and perspective shift, several other agent-backgrounding strategies have been described, including the impersonal use of a personal pronoun (3PL or 2SG; RSL, Kimmelman, 2018b, and Turkish Sign Language (TİD); Keleşir, Özkul, and Özparlak, 2018), and the use of deficient human pronouns such as ONE, SOMEONE, or OTHER (RSL, Kimmelman, 2018a, Italian Sign Language, Mantovan and Geraci, 2018, and Hong Kong Sign Language (HKSL), Sze and Tang, 2018, among others). All of the abovementioned strategies are also commonly witnessed in spoken languages.

A more sign-language specific means to background arguments is described by Barberà (2012 and later work), who shows that in LSC, high loci in the signing

space are associated with non-specificity – closely related to low referentiality – as opposed to low loci, which are used to refer to referents with a high degree of specificity. A similar partitioning of the signing space to distinguish between specificity and non-specificity is described for TİD (Kelepir et al., 2018), and Sze and Tang (2018) report for HKSL that loci in the upper signing space are associated with low referentiality.

The chapters in this book are based on an analysis of 1,085 clauses containing verb forms of different lexical types. The set of clauses that contain impersonal subjects, of which 281 examples were found in the data, are excluded from the analysis, as a detailed investigation of the properties of these constructions falls outside the scope of this dissertation. I briefly come back to impersonal constructions in Chapter 8.3.5.

1.2.7 Iconicity

Scholars have long wondered about the nature of the relation between linguistic form and meaning, a topic which has intrigued linguists, philosophers, and psychologists alike. A particularly influential perspective in this domain is expressed by Saussure (1916), who – himself inspired by work by the American linguist Whitney (1875) – offers that “language is a convention, and the nature of the sign we have agreed upon is inconsequential [*la langue est une convention, et la nature du signe dont on est convenu est indifférente*]”.¹³ In other words, Saussure argues that the relation between form and meaning in language is arbitrary. This notion continues to be influential, perhaps partially due to another impulse given to the idea several decades later by Hockett (1959, 1960), who includes arbitrariness into his list of defining characteristics (or ‘design features’) of human language. Although Hockett (1959, p. 34) acknowledges that onomatopoeia (e.g. ‘woof-woof’) may constitute exceptions to this general claim, he counters that “[...] onomatopoeic forms constitute only faint traces of iconicity”, where iconicity – being the opposite of arbitrariness – is defined as a form-meaning resemblance.

However, in sign languages, signs that have a clear iconic basis are pervasive. Even signs denoting abstract meanings may involve iconicity through the linking of iconicity to metaphor or metonymy (see Taub, 2012, for a literature overview on iconicity and metaphor in sign languages). On the assumption that sign lan-

¹³In Saussurean linguistics, ‘sign’ refers to the combined complex of the ‘signifier’, i.e. the linguistic form of the sign, and the ‘signified’, i.e. the meaning of the sign.

guages are natural languages, it therefore clearly does not need to be the case that “human language is almost wholly arbitrary” (Hockett, 1959, p. 34). The pervasiveness of iconicity in sign languages suggests that – even though arbitrariness is certainly present in sign language lexicon and structure, too – the purported arbitrary nature of human language may have been somewhat overemphasized.

In recent years, iconicity and/or non-arbitrariness in language – both signed and spoken – have become increasingly popular research subjects (see e.g. Dingemanse, Blasi, Lupyan, Christiansen, & Monaghan, 2015; Perniss, Thompson, & Vigliocco, 2010, for recent testaments to the ubiquity of iconicity in all human language). For instance, in spoken language, sound symbolism, where certain sounds in a language become associated with particular meanings (e.g. English ‘gl’ is generally used in words having to do with reflecting light, such as ‘glimmer’ or ‘glow’), is commonly attested. In fact, many non-Indo-European languages use sound symbolism systematically and pervasively (see e.g. Childs, 1994, on sub-Saharan African languages; Mikone, 2001, on Balto-Finnic languages; Nuckolls, 1996, on indigenous South-American languages).¹⁴

Across sign languages, a number of iconic strategies are frequently attested. A lot of signs, including many lexical verbs, involve handling, instrument, whole-entity, or body-part handshapes (see e.g. Hwang et al., 2017; Padden et al., 2013; Taub, 2012). The same kinds of handshapes are also used in classifier predicates, which additionally involve an iconically motivated movement representing the trajectory of the entity represented by the handshape.

Another commonly employed iconic strategy across sign languages is to systematically use both hands in lexical signs that denote inherently plural concepts (Börstell, Lepic, & Belsitzman, 2016; Lepic, Börstell, Belsitzman, & Sandler, 2016). Different types of plurality may be iconically conveyed in what Börstell, Lepic, and Belsitzman (2016) call ‘articulatory plurality’. For instance, the reciprocity involved in concepts such as ‘match’ or ‘fight’ is often lexically represented by each hand representing one side of the reciprocal situation. Collective nouns (e.g. AUDIENCE; GROUP) are also often two-handed signs, as are signs representing dual entities such as ‘scissors’ or ‘glasses’ (Börstell, Lepic, & Belsitzman, 2016).

A tool that can be used to represent iconic properties in sign language forms

¹⁴Sound symbolism is sometimes considered to be a form of ‘relative iconicity’, since there is not necessarily a one-to-one mapping between meaning and form, but rather a systematic association between an aspect of meaning and a particular phonological form (Monaghan, Shillcock, Christiansen, & Kirby, 2014). Still, the point is that the relation between form and meaning is not completely arbitrary.







is an iconic mapping, which spells out the systematic iconic associations between articulators (i.e. form) and source domain (i.e. meaning) (Taub, 2000, 2001). With the use of iconic mapping schemata, different phonological properties of a sign can be considered separately to determine for each of them which meaning aspect they may map onto. An example of an iconic mapping for the ASL sign DRILL, which iconically refers to a drill penetrating a wall, is represented in Table 1.1. The form is articulated at the center of the signing space with a -handshape moving toward the flat non-dominant hand, such that the index finger of the dominant hand ends up between the fingers of the non-dominant hand.

Table 1.1: Iconic mapping for the ASL sign DRILL, from Taub (2000, 2001).

Articulators	Source
Dominant handshape 	Long thin object with handle (in particular, a drill)
Non-dominant classifier handshape 	Flat surface
 inserted between fingers of  classifier	Penetration of surface

When metaphor is involved, Taub (2000, 2001) claims that two mappings take place: first there is an iconic mapping between Articulators and Source (e.g. a -handshape mapping onto eyes for seeing), followed by a metaphoric mapping between Source and Target (e.g. mapping seeing onto understanding).

I use iconic mappings in Chapters 4.2, 5.2, and 6.2 to identify which iconic form-to-meaning mappings are commonly employed by (subclasses) of body-anchored, neutral, agreeing, and spatial verbs in DGS. In the schemata, I consider which aspects of meaning the specifications for the main phonological parameters in sign languages (i.e. handshape, location, and movement) map onto.¹⁵ It is important to point out here that iconicity does not always dictate the overall meaning of a sign, i.e. there is not necessarily a one-to-one relationship. For instance, the verb form KILL in DGS iconically makes reference to a stabbing event; however, this form may also be used to refer to other types of killing. In other words, the meaning of this form is not ‘stab’, but rather its superset ‘kill’. Indeed, psycholinguistic studies (on ASL) have demonstrated that iconicity does not facilitate sign recall (Poizner, Bellugi, & Tweney, 1981) or lead to semantic priming

¹⁵For body-anchored verbs, the signer’s body is considered to be an additional iconically-motivated aspect of the verb’s form.

(Bosworth & Emmorey, 2010), suggesting that language acquirers do not necessarily pay iconic properties of signs much attention.¹⁶

So far, the discussion has focused on iconicity at the lexical level, but iconicity may also be attested at other levels of linguistic structure. A particularly hotly debated question is whether iconicity can affect syntax. Generally, functionalists appear to happily accept such a stance (see e.g. Croft, 2003; Dik, 1989; Givón, 1979; Haiman, 1980, 1985; Talmy, 2000), while formalists, in particular those taking a Generative Grammar perspective, tend to be more resistant. This is not surprising, since generativists tend to consider language structure to be autonomous, reflected in the notion of the existence of a language faculty in the human brain. Newmeyer (1992, p. 790), however, effectively argues against the idea that autonomy of language precludes iconicity effects, stating that “the autonomy of grammar is compatible with system-external triggers for system-internal changes”. Yet, there is little research available that is concerned with formalizing iconicity in spoken languages.

Unsurprisingly, structural iconicity has been explored in somewhat more detail in the study of sign languages. Studies that take a formal approach to iconicity in language structure include Aristodemo and Geraci (2018), Benedicto and Brentari (2004), Davidson (2015), Grose, Wilbur, and Schalber (2007), Kuhn and Aristodemo (2017), Meir et al. (2007, 2013), Oomen (2017), Rathmann (2005), Schlenker, Lamberton, and Santoro (2013), Schlenker (2014), and Wilbur (2003 and subsequent work); also see Schlenker (2018b) for a recent overview article. I will not provide an extensive discussion of these works here – although some of them, such as Meir et al. (2007), Davidson (2015), and my own study on psych-verbs in NGT (Oomen, 2017) will be featured at various places in this dissertation – but one important aspect that most of these studies share is the assumption that certain iconic properties have formal status, e.g. they are variables or features. As such, they can be accounted for with regular tools familiar from the standard formalist toolbox.

In this dissertation, in particular in Chapter 8 (part of which has been published as Oomen and Kimmelman, 2019), I also argue that iconicity affects grammatical structure. The arguments leading up to this conclusion can be found interspersed among Chapters 3 to 7.

¹⁶However, more recent research has shown that iconic signs are the first to be acquired by deaf children of deaf parents, even when any relevant variables are controlled for (Thompson, Vinson, Woll, & Vigliocco, 2013).

1.3 German Sign Language

DGS is the sign language used primarily by members of the German deaf community in everyday communication. It has gained official status as a recognized language in Germany in 2002.

DGS is a relatively well-researched language, although I should place the cautionary note that there is no standardized version of the language, and relatively little is known about grammatical differences among different variants of DGS (Macht & Steinbach, in press). Macht (2016) and Bross (2018) report some variation in the properties of the agreement auxiliary PAM (see Section 1.2.4), and Bross (2018) additionally reports some syntactic differences between southern and other varieties of DGS in the domains of negation and contrastive focus. Hillenmeyer and Tilmann (2012) describe some regional variation in the distribution of use of the temporal marker COME vs. the past tense marker (HAVE-)BEEN.

More is known about lexical variation in DGS (see Hillenmeyer & Tilmann, 2012; Macht & Steinbach, in press, for overviews). As with other sign languages, a correlation can be witnessed between deaf schools and regional variants of DGS (Eichmann & Rosenstock, 2014; Hillenmeyer & Tilmann, 2012), although Eichmann and Rosenstock (2014) report that the differences are becoming less pronounced. Lexical variation is particularly common in signs for numbers, days of the week, months, colors and family names (Hillenmeyer & Tilmann, 2012; König, Konrad, Langer, & König, 2012).

The data analyzed for the present dissertation represent 11 different regions in Germany (see Chapter 2.1). A detailed examination of regional variation falls outside the scope of this dissertation; as such, it should be borne in mind that there is always a chance that any variation attested in the data could be partially explained by regional differences.

It is not entirely clear when and under what circumstances DGS emerged, but its roots go back at least 200 years, to the same period of time during which other urban Western sign languages such as ASL and NGT started to develop. In Europe, the emergence of sign languages, which went in tandem with the development of deaf communities, was an outcome of large-scale urban migration taking place during the Industrial Revolution at the end of the 18th century (McBurney, 2012). During this period, deaf education also began to take flight across Europe, although differences in education philosophy led to markedly different teaching strategies in different parts of Europe.

In Paris, Abbé Charles Michel de l'Épée (1712-1789) founded the first school for the deaf worldwide, practicing a teaching strategy in which spoken French was accompanied by signs. De l'Épée partially borrowed these signs from the deaf community which had already settled in Paris, and partially devised them himself. This teaching strategy found itself in stark contrast to the method that educator Samuel Heinicke (1727-1790) began promoting and practicing in Germany at around the same time. Heinicke believed that deaf children benefitted most from learning spoken language and was thus a proponent of an oral education. His philosophy gained increasingly more ground over the course of the following century, leading up to the infamous Congress of Milan in 1880, where a resolution was passed endorsing the oralist method at the expense of sign language-based teaching strategies. In the decades that followed, the oralist method was widely practiced in countries across Europe, including Germany.

Given the long history of oralism in Germany, it perhaps comes as no surprise that the development of bilingual (sign + speech) education in Germany has lagged behind that of other European countries. Nonetheless, since the 1980s, bilingual teaching methods have slowly increased in popularity (Herrmann, 2013). Several deaf schools have now started up bilingual programs, including schools in Hamburg and Berlin (Günther, Schäfke, Koppitz, & Matthaei, 2004; Plaza-Pust & Weinmeister, 2008).

As in other countries, members of the deaf community in Germany have become increasingly more interested in human rights and emancipation issues, in parallel with a spread in interest in the history of their community and the language which unites it (Herrmann, 2013). Germany also has a flourishing network of deaf clubs and associations, the first club having been established as early as 1848 (Worseck, 2014). The precursor of the current Deutscher Gehörlosen-Bund (DGB; German Deaf Association), which represents the interests of the estimated 80.000 deaf people living in Germany, was founded in Weimar in 1927 (Albreghts, 1927).¹⁷ The linguistic study of DGS, carried out both by hearing and deaf researchers, has also grown in popularity, with research centers currently present in places including Hamburg, Göttingen, Berlin, and Cologne. At the Institute of German Sign Language and Communication of the Deaf in Hamburg, a long-term

¹⁷ It is unclear how many deaf people use DGS at native or near-native level. Beyond the group of deaf DGS signers, one should bear in mind that there are also hearing native signers, namely the children of deaf adults (CODAs), as well as many hearing non-native signers of DGS, including e.g. family members of the deaf, social workers, interpreters, students, and researchers.

and large-scale corpus project, aimed at documenting the everyday language of deaf people in Germany, is in its eleventh year at the time of writing. As mentioned earlier, a subset of this corpus has been annotated and analyzed for the present study; in the next section, I describe the benefits and challenges of such corpus-based research.

1.4 The value of corpus-based research

Corpus-based linguistics is a fast-growing methodology applied in the study of languages (Gries, 2009), facilitated by the steady increase in the number of large-scale corpora – be they text-based or signing- / speech-based.¹⁸

The development of corpus linguistics was originally a natural fallout from the rapid expansion of the world wide web in the 1990s – essentially a huge text-based corpus (Kilgarriff & Grefenstette, 2003). However, web-based corpus research has since been shown to come with a host of technical and theoretical problems (Gries, 2009; Kilgarriff & Grefenstette, 2003), such that the focus of the field has gradually shifted toward the compilation and analysis of corpora specifically created for linguistic purposes. In the compilation of such corpora, particular care must be taken to ensure that they are both representative and balanced (Gries, 2009). That is, corpora are designed both to accurately reflect variation in a language, as well as to ensure that the variation present in a corpus is proportionate to that attested in the real world. This is important, because corpus-based research tends to trade in frequencies and statistics (Gries, 2009); if there is unclarity about how a corpus is compiled, then it becomes unclear what those frequencies and statistics represent.

Indeed, one of the major benefits of corpora-based research over other methods – beyond the fact that corpus data is generally more naturalistic – is that it more accurately reflects variation in a language. Corpus data also offer extended contexts, which are usually lacking in e.g. elicited data. That is, corpus data are a reflection of language in actual use. Indeed, language users are known to generally be stricter in judgment than in naturalistic production (Labov, 1975). As such, corpus data may serve as a test bed for evaluating and further refining analyses

¹⁸I should note that the biggest corpora tend to be available only for the most well-researched languages, such as English (Gries, 2009). In practice – and as in other disciplines of linguistics – this means that there is an overrepresentation of Indo-European languages.

based on elicited data.

A drawback is that the linguistic annotation of corpora is an incredibly time-consuming task, and even more so for sign languages, where not just the two hands but also the face and body may convey linguistic information. In addition, there are currently limited possibilities for machine-automated annotation of sign language corpus data.

Another clear disadvantage, in particular from the perspective of the formal linguist, is that naturalistic corpora do not provide negative evidence: if a particular construction does not occur in a corpus, then it cannot be established whether this construction is (un)grammatical. Controlled elicitation remains a necessity to acquire such negative data (see Kimmelman, Klomp, & Oomen, 2018, for a discussion of how corpus and elicitation methods may complement each other in sign language research).

Nonetheless, studying corpus data is a good way to get a measure of the variation present in natural language use, even if the currently existing sign language corpora are not always large or balanced enough to pinpoint the factors that underlie this variation (as pointed out in Kimmelman et al., 2018). Indeed, it is not uncommon for results of corpus-based studies to contradict findings previously reported in studies based exclusively on elicited data (see e.g. Fenlon, Schembri, & Cormier, 2018; Geraci, Bayley, Cardinaletti, Cecchetto, & Donati, 2015; Klomp, 2019; Oomen & Pfau, 2017), thus underscoring the value of this type of data.

In general, most corpus studies are explorative or descriptive in nature (Gries, 2009). Nonetheless, it is possible to do formal work using corpus data – indeed, it may even lead to unexpected findings which are unlikely to have been discovered had only elicited data been used – although as of yet, just a few formal studies on sign languages have used this method.¹⁹ The research presented in this dissertation, some of which falling in the formal realm, is primarily based on corpus data, although two native signers of DGS provided additional judgment data to verify some of the corpus results.

1.5 The NWO project

This dissertation is one of the outcomes of the four-year research project entitled *Argument structure in three sign languages: typological and theoretical as-*

¹⁹I have previously used this approach; see Oomen (2017) as well as Oomen and Kimmelman (2019), an adaptation of which is presented in Chapter 8.2 of this dissertation.

pects, funded by the Netherlands Organization for Scientific Research (NWO) under project number 360-70-520. The PIs were Dr. Roland Pfau and Prof. Dr. Enoch O. Aboh, and the project involved one postdoc researcher (Dr. Vadim Kimmelman) and two PhD students (Vanja de Lint and myself).

The sign languages included in the project are RSL, investigated by Vadim Kimmelman, NGT, studied by Vanja de Lint, and DGS. These languages are not historically related, although German and Dutch, the spoken languages that are in contact with DGS and NGT, are. While studies on certain linguistic aspects are available for all three sign languages, their argument structure had not been investigated at all prior to the start of the project. Another reason why these languages were selected as part of the project is that recently created corpora are available for all three languages.

Argument structure can be defined as the lexical representation of a predicate, based on which its argument-taking properties are determined. Argument structure is an understudied area of research in sign language linguistics, although Kegl (1990) and Leeson (2002), who investigated argument structure phenomena in ASL and Irish Sign Language, respectively, form some notable exceptions. As discussed in 1.2.6, there is also some work available on passives and impersonal constructions in several sign languages.

The typological aim of the overall project was to provide a comprehensive descriptive overview of argument structure in sign languages and to compare the results to patterns attested in spoken languages. A related aim was to identify what type of argument structure alternations (variability in a verb's argument structure, e.g. a transitive-intransitive alternation) and argument structure changes (morphosyntactic grammatical processes to change the argument structure of a verb, e.g. passivization) are attested in sign languages.

The primary theoretical goal was to test how existing theories of argument structure couched within the Generative Grammar framework hold up against sign language data. Scholars within this framework have different views with regard to how much the lexicon vs. syntax is involved in argument structure. Lexicalists assume a heavily enriched lexicon in which morphosyntactic processes can take place (see e.g. Dowty, 1979; Grimshaw, 1990; Hale & Keyser, 1993; Levin & Rappaport Hovav, 1995), whereas those who advocate a syntactic approach to argument structure argue that the syntax does most of the heavy lifting, with the lexicon assumed to be relatively impoverished (see e.g. Borer, 2005; Dowty, 1989; Kratzer, 1996; Marantz, 1997; Ramchand, 2008). In the middle, we find linguists

who claim that some languages are best characterized as ‘lexical’, while others are more ‘syntactic’ (see e.g. Horvath & Siloni, 2011; Reinhart & Siloni, 2005).

In general, a lexicalist view on argument structure would be more befitting of languages that display seemingly idiosyncratic behavior in how their predicates select their arguments, since such behavior suggests that the argument structures of individual verbs need to be learned and memorized separately. A syntactic approach, on the other hand, is arguably more apt at capturing regularities in languages, since such an approach relies on the assumption that grammar is rule-governed and constraint-based. Of course, there may be cross-linguistic variation in the extent to which languages lexicalize argument structure properties.

The study of sign languages may offer a fresh perspective on this theoretical debate. A particularly interesting question to consider in this regard is whether – and if so, how – modality-specific properties, such as the use of space, iconicity, and structural simultaneity in sign languages, affect or mediate argument structure. Indeed, this question resurfaces in almost all of the research output from this project (see below). At the same time, similarities between spoken and sign languages are equally interesting to consider, as they may provide us with a better insight into those argument-structural properties that apparently lie at the core of all languages – independent of the modality via which they are transmitted.

The project has yielded various significant research findings. Firstly, Kimmelman (2018a) shows for RSL that the argument-structure patterns found in this language are typologically common, thus providing evidence that there is a strong shared semantic foundation underlying argument structure across modalities. In Oomen (2018), an extended version of which is included as Chapter 3 in this dissertation, I provide additional support for the latter conclusion by showing that the same semantic event properties that mediate transitivity marking in spoken languages (see Hopper & Thompson, 1980; Malchukov, 2005; Tsunoda, 1981) also govern verb type in DGS.

Further evidence for the modality-independent nature of aspects of verb semantics is provided by two papers (Börstell et al., in press; Kimmelman, 2016) that investigate whether the transitivity-prominence hierarchy as proposed by Haspelmath (2015) for spoken languages equally applies to sign languages. The hierarchy is intended to reflect that some verbs are cross-linguistically more likely to be transitive than others, as well as that some languages include more verbs with a transitive coding frame than others. Kimmelman (2016) shows for RSL that transitivity, calculated as the proportion of overt direct objects occurring with fre-

quent verbs in the RSL corpus, is highly positively correlated with Haspelmath's (2015) transitivity-prominence hierarchy, indicating that transitivity ranking is modality-independent in nature. In Börstell et al. (in press), we provide further support for this conclusion by extending the study to a total of five sign languages, including RSL, DGS, NGT, Swedish Sign Language, and Finnish Sign Language. The results show that these languages are positively correlated with one another as well as with spoken languages in terms of transitivity.

Three other studies resulting from the project (de Lint, 2018; Kimmelman, de Lint, et al., 2019; Kimmelman, Pfau, & Aboh, 2019) focus on the argument structure of classifier predicates, and evaluate whether the claim by Benedicto and Brentari (2004) that classifiers determine argument structure holds across sign languages. As discussed in Section 1.2.3, Benedicto and Brentari (2004) argue for ASL that classifiers introduce internal and/or external arguments, as evidenced by the fact that different classifier handshapes, analyzed as morphemes, trigger different argument structures. This speaks in favor of a syntactic analysis, since the classifier predicate itself (i.e. the movement) needs to combine with a classifier morpheme to determine the argument structure of the clause.

Based on an elicitation study, de Lint (2018) shows that, as in ASL, classifier constructions in NGT show categorical mappings between classifier type and argument structure. In particular, handling and whole-entity classifier predicates may partake in a transitive-intransitive alternation, where manner verbs (e.g. predicates denoting meanings such as 'sweep', 'brush' or 'screw') most reliably produce consistent alternating pairs. Kimmelman, Pfau, and Aboh (2019) show that handling classifier predicates in RSL may express a variety of complex event structures consisting of two subevents and propose a formal analysis to account for these different event structures. In Kimmelman, de Lint, et al. (2019), we argue that, although the systematic associations between classifier type and argument structure as reported by Benedicto and Brentari (2004) for ASL generally hold, there are also systematic exceptions in the four sign languages we investigated, namely DGS, NGT, RSL, and Kata Kolok. Specifically, we show that whole-entity classifier predicates sometimes occur in unergative and transitive constructions rather than the unaccusative constructions they are expected to appear in. We also confirm, in line with Kimmelman, Pfau, and Aboh (2019), that handling classifier predicates may express various complex event structures in all four sign languages.

Finally, several articles (Oomen, 2017, Kimmelman, 2018c, and Oomen & Kim-

melman, 2019, a version of which appears in Chapter 8.2 of this dissertation) investigate the behavior of null subjects in sign languages. The studies show that the licensing of null subjects with certain verb types is affected by iconicity. In Oomen (2017) and Oomen and Kimmelman (2019), we show that null subjects in clauses with body-anchored verbs in three sign languages, namely NGT, RSL, and DGS, may be dropped only in case they represent first-person referents, leading us to propose that the iconically-motivated body-anchoring of a verbal sign triggers an automatic first-person interpretation of a null subject. Kimmelman (2018c) shows for RSL that the constraints on null subjects with classifier predicates are less strict than with other verb types. He argues that classifier predicates possess a demonstrating component, which facilitates the identification of a referent – even in the absence of overt agreement marking (also see Chapter 8.1.1 for a similar analysis of null subjects in constructions with spatial verbs in DGS).

Altogether, the studies discussed above attest to clear modality-independent principles as well as modality-specific patterns underlying argument-structure phenomena. The various chapters in this dissertation are equally devoted to disentangling modality-specific from modality-independent properties in the verbal domain. The main goals of this dissertation are described in the next section.

1.6 Goals of this dissertation

The primary goal of this dissertation is to characterize the verb classification system in DGS in semantic and morphosyntactic terms in order to identify the underlying grammatical mechanisms that both regulate and interact with argument structure across verbs of different types. The verb types that are investigated in this dissertation are initially distinguished based on their phonological properties (see Chapter 2.3.3 for discussion). There are four main research questions:

- (i) What are the semantic and morphosyntactic properties of verbs of different types in DGS?
- (ii) Which semantic and morphosyntactic properties are shared among verbs of different types in DGS, and which are type-specific?
- (iii) What role does iconicity play in the lexical forms and the morphosyntactic behavior of verbs of different types in DGS?

- (iv) Do the overall results point toward a shared or distinct underlying syntactic structure of constructions with verbs of different types in DGS?

As discussed in Section 1.2.3, researchers have previously claimed that the verb classification system in sign languages is partially semantically grounded. However, the underlying semantics of different verb types has, as of yet, not been investigated in detail. Furthermore, considerable attention has gone out to the class of agreeing verbs in sign languages, while other verb types have been investigated much less intensively.

This dissertation aims to offer a more balanced investigation of different verb types by presenting an analysis of over 1,000 clauses analyzed in naturalistic conversational data from the DGS Corpus (<https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>). The clauses were selected by searching for verbs denoting meanings from a list of verb meanings that are meant to be representative of the verbal lexicon in all languages (ValPaL list; Hartmann, Haspelmath, and Taylor (2013)), yielding a set of verb forms representing verbs of all types.

The data were annotated and analyzed to identify the semantic and morpho-syntactic properties of the 107 different verb forms included in the data. Various methods of analysis are employed, including (i) the application of semantic maps – a typological tool – to investigate the semantic profiles of verbs of different types, (ii) the construction of iconic mapping schemata (Taub, 2000, 2001) to identify recurring iconic form-to-meaning patterns, (iii) frequency and/or statistical analyses of constituent orders and occurrences of subject drop in the corpus data, and (iv) qualitative analyses of valency patterns and modification properties of different verb types.

Throughout this thesis, a question that I keep returning to is how iconicity affects and interacts with the phonological properties and morphosyntactic behavior of verbs. I pinpoint the role of iconicity by systematically analyzing the iconically-motivated phonological properties of verb forms, by investigating its mediating role in the relation between verb semantics and verb form, and by identifying systematic morphosyntactic patterns in the data that might be best explained by appealing to iconicity.

All the different subparts of the research presented in this book lead up to a proposal for a syntactic account, which is couched within Generative Grammar, in Chapter 8. Since this chapter is the only one to involve formal syntactic analyses, the theoretical concepts and machinery that figure in this account are introduced in that chapter instead of in the present chapter. Although the analysis builds on

the descriptive and typological work presented in the preceding chapters, it can be read independently from the rest of the book.

1.7 Outline of this dissertation

The research presented in this dissertation is primarily based on the analysis of the corpus data annotated for this project. The annotation procedure, and some of the challenges in the process, are described in detail in Chapter 2. In this chapter, I also describe the procedure for the elicitation sessions I conducted with two DGS signers in order to collect some supplementary data.

Chapter 3 reports on a semantic analysis of the verb forms in the data set. The study is predicated on the hypothesis that there is a connection between the verb classification system in sign languages and transitivity marking in spoken languages, motivated in part by the observation that agreeing verbs, having the ability to mark two arguments, must necessarily be transitive. I apply a semantic map intended to make predictions about transitivity marking in spoken languages (see Malchukov, 2005) to the DGS data to investigate whether the results provide support for this hypothesis.

Chapters 4, 5, and 6 form a trilogy of chapters that describe the properties of different verb types, namely body-anchored verbs, neutral verbs, and agreeing verbs, including spatial verbs. Each chapter is structured similarly and investigates systematic iconic form-to-meaning patterns in verbal forms of different types, as well as morphosyntactic aspects including constituent order, valency patterns, modification properties (if applicable), and subject-drop patterns.

The results from these three chapters, as well as Chapter 3, are systematically compared in Chapter 7 in order to pinpoint the similarities and differences between verbs of different types. This comparison forms the foundation for a unified syntactic analysis of body-anchored, neutral, and regular agreeing verbs, which I lay out in Chapter 8. Based on the results, I conclude in the same chapter that spatial verbs need a different formal treatment.

Chapter 9 highlights the main findings and offers some thoughts about opportunities for further research on verb classification in sign languages. The implications of the study for the wider field of sign language linguistics, and linguistics in general, are also discussed.

CHAPTER 2

Annotation of the corpus data

THE starting point of this work is a set of annotated video clips from the DGS Corpus (Blanck et al., 2010) featuring naturalistic dialogues between signers of German Sign Language (DGS). I added additional layers of annotations to these files to represent information about clauses with verbs that represent any of 80 verb meanings from a list used previously in typological investigations of argument structure in spoken languages (Hartmann et al., 2013). In the following sections, I offer a description of the DGS Corpus (Section 2.1), the verb meaning list (Section 2.2), and the annotation procedure (Section 2.3), which follows the guidelines established for the NWO project that this dissertation is a part of. Methodological challenges are discussed in Section 2.4. In addition to analyzing the corpus data, I collected some additional data in a more controlled setting with two DGS signers; the procedure for the data collection sessions is described in Section 2.5. Section 2.6 summarizes the chapter.

2.1 The DGS Corpus

The DGS Corpus is a long-term project carried out by researchers at the Institute for German Sign Language and Communication of the Deaf (IDGS) at Hamburg University in Germany. Its aims are to collect DGS data in an annotated corpus and to develop a corpus-based electronic DGS - German dictionary (Blanck et al., 2010). The project commenced in 2009 and is set to run until 2023. Data collection was completed in 2012 and has yielded a total of 1160 hours of footage with 330 deaf signers of DGS, participating in pairs, from thirteen different regions in Germany (Langer, 2012). Annotation of the data is an ongoing process and is done in iLex, a tool for sign language lexicography and annotation of sign language corpora developed at Hamburg University (Hanke, 2002; Hanke & Storz, 2008). Some 50 hours of dialogues with basic transcriptions and annotations have been made accessible online via <https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>. At the time this project was in the data-analysis phase, 58 videos with corresponding annotation files had been made available. This selection makes up the data set for the current investigation.

The 58 videos were released in two phases. The first batch of data was released in June 2016 and consists of 49 files. The second selection of footage, containing nine files, was released in October 2016. In total, the data set constitutes approximately 8 hours and 30 minutes of material.

For each dialogue in the data set, there are three QuickTime video files: two

files with frontal views of the participating two signers and one file with a side-ward view of the two signers and a frontal view of the moderator. While annotating the data, I principally relied on the two videos with frontal views of the signers, consulting the video with the sideward angle only when deemed necessary for the accuracy of the annotations. The annotation files were made available as both iLex and converted ELAN files; I made use of the ELAN files.¹ The annotation files include two sets of the following tiers, one each for the signers A and B in each dialogue:

- **Lexem_Gebärde_A/B_1:** Time-aligned lexeme glosses in German for one-handed signs produced with the dominant hand, or two-handed signs.
- **Lexem_Gebärde_A/B_2:** Time-aligned lexeme glosses in German for one-handed signs produced with the non-dominant hand.
- **Lexem_Gebärde_A/B_3:** Time-aligned lexeme glosses in English for one-handed signs produced with the dominant hand, or two-handed signs.
- **Lexem_Gebärde_A/B_4:** Time-aligned lexeme glosses in English for one-handed signs produced with the non-dominant hand.
- **Lexem_Gebärde_A/B_5:** Time-aligned glosses represented in the HamNoSys phonetic transcription system (Hanke, 2004) for (a) one-handed signs produced with the dominant hand, or (b) two-handed signs.
- **Lexem_Gebärde_A/B_6:** Time-aligned glosses represented in the HamNoSys phonetic transcription system (Hanke, 2004) for one-handed signs produced with the non-dominant hand.
- **Deutsche_Übersetzung_A/B:** German free translation of produced signing. Annotation units may include several clauses.
- **Englische_Übersetzung_A/B:** English free translation of produced signing. Annotation units may include several clauses.
- **Mundbild_Mundgestik_A/B:** Mouthings and mouth actions. The former are mouthed (parts of) German words; the latter refer to all other kinds of mouth pictures, and are usually annotated in the data as [MG].

Figure 2.1 shows an excerpt from one of the annotation files.

The DGS Corpus uses ID-glosses, i.e. unique identifiers for every lexeme. The phonological form of a sign determines which ID-gloss it receives. The HamNoSys

¹ELAN Linguistic Annotator is a tool for the creation of complex multiple-tier, time-aligned, linguistic annotations of audio and/or video data (<https://tla.mpi.nl/tools/tla-tools/elan/>; Sloetjes and Wittenburg, 2008).

Time	Lexem_Gebärde_A_1	Lexem_Gebärde_A_2	Lexem_Gebärde_A_3	Lexem_Gebärde_A_4	Lexem_Gebärde_A_5	Lexem_Gebärde_A_6	Deutsche_Übersetzung_A	Englische_Übersetzung_A	Mundbild_Mundgestik_A	Lexem_Gebärde_B_1	Lexem_Gebärde_B_2	Lexem_Gebärde_B_3	Lexem_Gebärde_B_4	Lexem_Gebärde_B_5	Lexem_Gebärde_B_6	Deutsche_Übersetzung_B	Englische_Übersetzung_B	Mundbild_Mundgestik_B	
00:00:45.800 - 00:00:46.800																			
00:00:46.800 - 00:00:47.000									grund										
00:00:47.000 - 00:00:47.200							Damals war ich noch zu klein, um sie zu kennen.	At that time I was too little to know her.											

Figure 2.1: A fragment of an annotation file with tiers and annotations created by the DGS Corpus Project team.

transcription system (Hanke, 2004) is used to transcribe the form of each token, and each transcription is linked to an ID-gloss. Different lexical forms that describe the same meaning are distinguished by means of numbers suffixed to the ID-gloss, e.g. KATZE1 vs. KATZE2 for two lexical forms with the meaning ‘cat’. Letter suffixes indicate small phonological differences between otherwise identical forms, e.g. KATZE1A vs. KATZE1B.

The video clips in the data set include dialogues about a variety of news topics such as the death of Princess Diana or the collapse of the Twin Towers, topics related to Deaf culture such as the Deaflympics and other Deaf events, and more personal topics such as the signers’ experiences in (a deaf or hearing) school. Elicited material is not part of the data set.

A total of 104 signers participate in the 58 dialogues. Some dialogues feature the same signers, but none of the signer pairs feature in more than two videos. Table 2.1 presents some metadata.

File names, assigned by the project team in Hamburg, combine an abbreviation of the name of the region where the conversations were recorded and a number distinguishing signer pairs, e.g. hh06 for signer duo 6 from the Hamburg

Table 2.1: (a) Age, (b) sex, and (c) region of residence of participants in the data set (N=104).

(a)		(b)		(c)		
Age		Sex		Region		
18-30	19	Male	54	Berlin	ber	6
31-45	33	Female	50	Frankfurt	fr	12
46-60	32			Göttingen	goe	6
61+	20			Bremen	hb	10
				Hamburg	hh	8
				Köln	koe	20
				Leipzig	lei	12
				Münster	mst	12
				Rostock	mvp	4
				Schleswig-Holstein	sh	4
				Stuttgart	stu	10

region. Table 2.1c lists the abbreviations for each region. Copies of the files with my own annotations are saved under the same names, except when two different files involve the same signers, in which case I suffixed an ‘a’ or ‘b’ to the original file names to distinguish them. The 58 ELAN files containing (only) the annotations I created can be found at <https://doi.org/10.21942/uva.9778556>. Identifier codes are added to the file names in order to enable matching with the corresponding video and annotation files made publicly accessible by the DGS Corpus team at <https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>.²

Throughout this dissertation, I indicate with a code where examples from the DGS Corpus that are included in the text can be found in the data. To give an example: [ber04-B-01:35.50] refers to an example signed by signer B in file ber04, starting at 01:35.50.

2.2 The ValPaL list

I selected clauses in the corpus data based on a list of 80 verb meanings compiled by the Leipzig Valency Classes Project team (Hartmann et al., 2013; Malchukov & Comrie, 2015). This list, shown in its entirety in Table 2.2, has been specifically designed to be representative of the verbal lexicon across languages, in particular

²Under the ‘Transcript’ tab, scroll over the file names (e.g. dgskorpus_ber_01) to find the identifier codes.

with respect to valency properties.³ It is inspired by the semantic classification of English verbs proposed by Levin (1993). The aim of the ValPaL project is to facilitate and carry out large-scale cross-linguistic comparison of valency classes. So far, data have been collected for a representative sample of 36 languages; these data are compiled in an online open access database (<http://www.valpal.info>). An edited volume reports on findings for 30 of these languages (Malchukov & Comrie, 2015).

Table 2.2: The ValPaL list of verb meanings (N=80).

Verb meanings			
ASK FOR	DRESS	LEAVE	SHAVE
BE A HUNTER	EAT	LIKE	SHOUT AT
BEAT	FEAR	LIVE	SHOW
BE DRY	FEEL COLD	LOAD	SING
BE HUNGRY	FEEL PAIN	LOOK AT	SINK
BE SAD	FILL	MEET	SIT
BLINK	FOLLOW	NAME	SIT DOWN
BOIL	FRIGHTEN	PEEL	TEACH
BREAK	GIVE	PLAY	SMELL
BRING	GO	POUR	STEAL
BUILD	GRIND	PUSH	TAKE
BURN	HEAR	PUT	TALK
CARRY	HELP	RAIN	TEACH
CLIMB	HIDE	ROLL	TEAR
COOK	HIT	RUN	TELL
COUGH	HUG	SAY	THINK
COVER	JUMP	SCREAM	THROW
CUT	KILL	SEARCH FOR	TOUCH
DIE	KNOW	SEE	WASH
DIG	LAUGH	SEND	WIPE

Given that the ValPaL list is intended to consist of a representative set of verbs, the expectation was that using it would serve as an important step toward gaining a better understanding of the argument structure and other properties of verbs in DGS, Sign Language of the Netherlands (NGT) and Russian Sign Language (RSL). It also facilitates (a) the comparison of the results from DGS, NGT and RSL to those of spoken languages, and (b) the comparison of the three sign languages to each

³Verb meanings are represented in CAPITALS to distinguish them from sign glosses in SMALL CAPITALS.


other. Comparative work featuring the three sign languages is reported in Kimmelman, de Lint, et al. (2019) and Börstell et al. (in press). The focus of this dissertation is on DGS alone.

2.3 The annotation procedure

Signs representing verb meanings from the ValPaL list were identified in two steps. First, I performed a systematic search using the English meaning labels in Table 2.2, as well as synonyms and, in some cases, antonyms or words that are otherwise semantically closely related to the target word (see Section 2.3.1 for details). As a second step, and because glosses on the English-language tiers were occasionally represented in German rather than English, German translations of the meaning labels in Table 2.2 and other keywords that were used in the first round were entered as search terms in a second identification round.

A different procedure was used for classifier predicates (see Section 1.2.3), which are not systematically annotated in the DGS Corpus: they are either indicated on the German gloss tier with a regular ID-gloss, or they are labeled \$MAN*.⁴ This made it impossible to systematically identify classifier predicates without avoiding a bias for the forms annotated as \$MAN*. Further complicating matters is that this same label is also used for gestures of different types. I therefore manually searched through all of the 49 files of the first batch of data in order to identify classifier predicates. Sections 2.3.8 and 2.3.9 present more details about the annotation procedure for these predicates.

For each token, clause boundaries were determined (see Section 2.3.1 for a description of the procedure), and these are reflected in the scope of the annotation for the example. After annotation of the verb meaning on the AS-verb tier, further annotations were added on several other tiers specifying a variety of information about the verb, its arguments, and other properties of the clause. Table 2.3 presents an overview of these tiers; indentation in the first column indicates tier dependency.

⁴Thus, some tokens that I analyze as classifier predicates are considered lexical signs by the DGS Corpus annotators. To give an example, the gloss GO3 refers to a sign that is articulated with a -handshape, representing the legs of a two-legged creature. The movement depicts the referent's movement, which may be as specific as, for instance, a walk up a circular staircase. Given these characteristics, I analyzed tokens of this sign as a classifier predicate rather than a lexical sign.

Apart from a few minor exceptions mostly resulting from corpus-specific differences, identical protocols were followed in the projects on DGS, NGT and RSL for the annotations on the AS-verb tier and all tiers directly dependent on it (see Table 2.3), in order to facilitate comparison of the three languages. The four tiers dependent on the AS-type tier were created specifically for the purposes of this dissertation.

Table 2.3: Annotation tiers added to the DGS Corpus. Indentation in the left column indicates tier dependency.

Tier	Information
AS-verb	Sign gloss.
AS-WO	Constituent order.
AS-type	Verb type.
AS-1-agreement	For agreeing verbs: locus alignment with an argument at the verb's initial place of articulation.
AS-2-agreement	For agreeing verbs: locus alignment with an argument at the verb's final place of articulation.
AS-ext-localization	For neutral verbs: locus alignment with the external argument.
AS-int-localization	For neutral verbs: locus alignment with the internal argument.
AS-referent	Properties of the subject referent.
AS-alternation	Notes about possible argument structure alternations or changes.
AS-comments	Comments.
AS-class	Classifiers: predicate class according to Corpus NGT guidelines.
AS-meaning	Classifiers: description of predicate meaning.

The screenshot in Figure 2.2 shows an example of a fully-annotated example from the corpus. The clause featured in the example is glossed in (1).⁵

- (1) DOG CAT ALREADY EARLY **LEAVE**_{a*}
 'The dog and the cat had already left early.' [hb06a-B-02:02.85]

The next subsections describe in detail what sort of information was annotated on each of the tiers.

⁵See Notation conventions for an explanation of the glossing conventions used in examples. In all corpus examples in this dissertation, predicates representing verb meanings from the ValPaL list are indicated in bold.

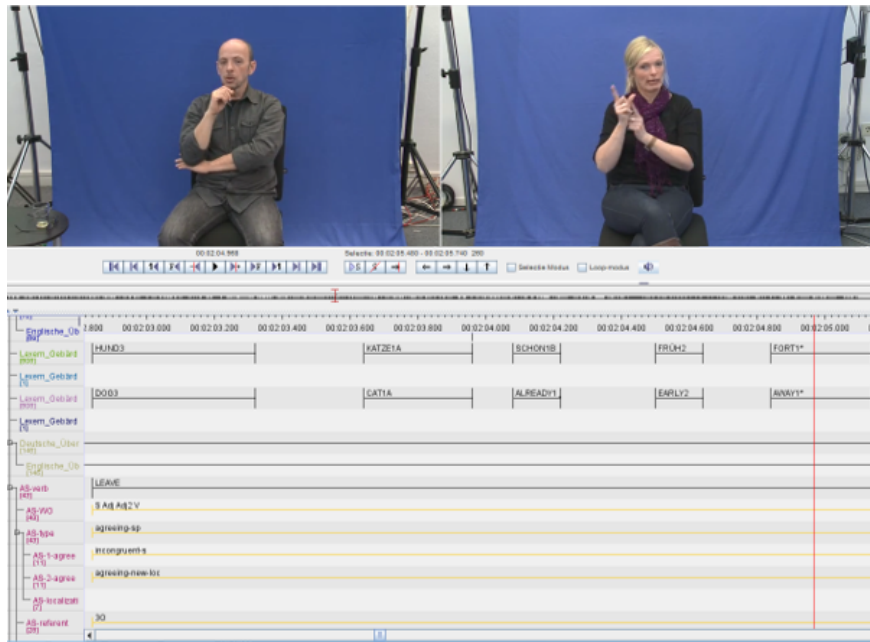


Figure 2.2: ELAN screenshot of example (1).

2.3.1 AS-verb

AS-verb is an independent tier; all other tiers are dependent on it.

For each selected verb token, a new annotation was created on the AS-verb tier with a label indicating its meaning. Verb meanings that consist of two or more words are hyphenated, e.g. BE-HUNGRY. Some of the verb meanings in Table 2.2, such as SINK, COVER, and LOAD, are expressed as classifier predicates in DGS and are labeled CLASSIFIER.

The length of the annotation reflects the clause boundaries within which the token appears. For instance, the annotation for example (1) is aligned with the start of the sign DOG and the end of the sign LEAVE, as shown in the screenshot in Figure 2.2. It is important to point out that delineating clause boundaries in signed discourse is a notoriously difficult task. In Section 2.4.1, I expound further on the challenges and how they were navigated. For now, let it suffice to say that a combination of semantic and prosodic cues guided the delineation process.

For verb meanings for which only a few tokens were found in the data, additional search terms were used whenever possible to identify semantically simi-

lar predicates. For instance, in addition to annotating predicates expressing the meaning BE-DRY, annotations were made for predicates expressing the meaning BE-WET. The same verb meaning is often expressed with different lexical forms, which are distinguished by means of number suffixes following the meaning label, e.g. LIVE1 and LIVE2. No tokens were found for the nominal predicate BE-A-HUNTER. Instead, I annotated clauses with predicates that express the meaning BE-DEAF, which are frequently attested in the data.

For each verb meaning, a maximum of about 50 tokens were annotated. If there were more tokens available for a particular verb meaning, then every n^{th} token was selected, where n is the total number of tokens divided by 50. For example, there are 201 tokens of SEE in the data set, so every $201 / 50 \approx 4^{\text{th}}$ token was annotated (see Table A.1 in Appendix 1 for a listing of all verb forms that were annotated and their frequency of occurrence in the data set).

2.3.2 AS-WO

The AS-WO (for ‘word order’) tier includes annotations representing the constituent order in the clause. Dedicated labels indicate verbs and their arguments, but also other types of constituents. Symbols are used to signal role shift, embedding, and prosodic boundaries. Table 2.4 lists the inventory of labels and symbols used. Labels are combined, separated by a space, so as to reflect the constituent order of each of the examples, e.g. ‘S V Neg’. In the following subsections, I discuss all of the labels in turn.

2.3.2.1 Verbs and predicates

Signs that semantically look like verbs or predicates, including classifiers, are labeled V. Problematically, many signs that are used as verbs can also be used in the same form as nouns or adjectives. For example, the phonological form of the sign PLAY2 is identical in examples (2a) and (2b), but we can gather from the context that it likely acts as a verb in (2a), but as a noun in (2b). Section 2.4.3 goes into more detail about the challenges of the labeling process and discusses which choices were made when the word category of a particular sign was unclear.

- (2) a. HEARING INDEX₀ INDEX₁ PLAY2
 ‘I used to play with the hearing kids.’ [fra15-A-00:11.25]

Table 2.4: Syntactic labels on the WO-tier.

Category	Syntactic label	Description
Verbs and predicates	V	Verb or predicate.
	V'	Second verb in a synonymous serial verb construction.
	V2	Second verb in a serial verb construction with two independent verbs.
	V-comp	Second verb in a complex predicate.
Arguments	S	Subject.
	O	Direct object.
	O2	Indirect object (thematic recipient or goal).
	CO	Clausal object.
	S/O and O/S	Subject and object (linear sequence) in clauses with a symmetrical verb.
Modals and auxiliaries	O/Loc, O/Time, O/Instr O/Goal	Adverbial constituent that semantically looks like an argument.
	Mod	Modal verb.
	Aux	Agreement auxiliary PAM.
	Aux-sp	Auxiliary borrowed from spoken language.
Other constituent types	Neg	Negative element.
	Conj	Conjunction.
	Perf	Perfective marker.
	Adj	(Other) adjuncts and adverbials.
Nouns and adjectives	Part	(Discourse) particle.
	N	Noun (phrase).
Boundaries	A	Adjective.
	\	Prosodic boundary.
	[]	Role shift boundaries.
	#	(Start of) dependent clause.

b. THEN INDEX_a WORLD **PLAY2** INDEX_a SOFIA INDEX_a

‘Then the World Games took place in Sofia.’ [koe11-A-02:34.00]

Occasionally, an example includes a series of two or more verbs or predicates which semantically appear to belong to the same clause. I distinguish between three types of multiple verb constructions. Firstly, in constructions with two independent verbs, the second verb is labeled V2 (the first verb is simply labeled V), with subsequent verbs being labeled V3, V4 etc. An example is given in (3).

- (3) $\overline{\text{COME PLAY}}^{\text{rs}}$
 “Come play!” [fra05-B-02:27.45]

Secondly, in serial constructions with two or more synonymous verbs, the second verb of the construction is labeled *V* (and the third, if present, *V'*). Thus, *SAY* and *TELL* in example (4) are labeled *V* and *V'*, respectively.

- (4) $\overline{\text{GO1}}^{\text{re}} \setminus \text{SAY TELL1 INDEX}_a \text{ MAKE INDEX}_a$
 ‘Once you go home, you can tell [your friends] about your experiences.’
 [fra07-A-02:13.30]

Finally, in constructions in which two verbs describe a single event but each have a different argument structure, the second predicate is labeled *V-comp* (for ‘complex’). For instance, the classifier predicate $\text{CL}(\text{聋})\text{:TAKEN-BY-HAND}$ in example (5) has a Patient subject and the verb *TAKE-ALONG* involves an Agent subject (which is impersonal in (5)), but these two predicates together still describe a single event.

- (5) $\overline{\text{THROUGH PARENTS}}^{\text{re}} \setminus \text{AUTOMATIC INDEX}_1 \text{ CL}(\text{聋})\text{:TAKEN-BY-HAND}_1 \text{ TAKE1}$
 ‘Because of my parents, I was automatically taken to [the Deaf club].’
 [stu03-A-00:51.30]

2.3.2.2 Arguments

Arguments are labeled, to the extent to which that is possible, according to their semantic function in the clause. The main categories are *S* for subject, *O* for (direct) object, *O2* for indirect object, and *CO* for clausal object. As a rule, arguments that are semantically recipients or goals are classified as indirect objects. Subordinate clauses that are not clausal objects, such as conditionals, are not included in the annotation unit and are not represented on the word order tier.

In clauses with the verb *MEET1/2*, which entails a reciprocal relation between the subject and object, the arguments are labeled depending on which referent the context signals as the most prominent (e.g. because it is the topic); this argument is labeled *S/O*. The other argument receives the label *O/S*.

Finally, adverbs that semantically look like arguments were labeled *O/* followed by a descriptive tag. Options are *Loc* for location, *Instr* for instrument, and *Goal* and *Time*. For instance, *AUSTRIA* in (6) is labeled *O/Loc*.

- (6) INDEX₁ REGULAR₁ GO1_a AUSTRIA₁ BACK-AND-FORTH++_a
 ‘We went to Austria over and over again.’ [hb06a-B-00:08.95]

Again, a fair few factors complicated the labeling process; they are discussed in Section 2.4.3.

2.3.2.3 Modals and auxiliaries

Modal verbs, toward which WANT, WISH, CAN, ALLOWED, MUST and NEED are counted as members, are labeled ‘Mod’ on the AS-WO tier.⁶ Most of these modals have negative counterparts that are derived through suppletion or affixation (see Pfau & Quer, 2007, for a discussion of negative modals in DGS). In fact, the data set includes only negative forms of the modal ALLOWED. WISH is included as a modal because it behaves like WANT and is better translated as ‘would like’. ALLOWED and NEED are included because they behave similarly to the other verbs: they consistently co-occur with lexical verbs and they also have negative forms.

The auxiliary conventionally referred to as PAM for ‘person agreement marker’ (Rathmann, 2003) is labeled ‘Aux’. For more information on PAM, see Chapter 1.2.4. A handful of tokens in the data appear to be auxiliaries borrowed from German or Sign Supported German. They have been glossed as HAVE and WAS (i.e. past tense of ‘be’); I labeled them ‘Aux-sp’ (for *spoken language*) on the AS-WO tier.

2.3.2.4 Other types of constituents

While the focus of this dissertation is on verbs and their arguments, all other constituent types also received a label on the AS-WO tier, although the categories encompassing them are somewhat more broadly defined. The following labels are used:

- **Neg**: For manual negative elements such as NOT, NEVER etc.
- **Conj**: For conjunctions such as IF, THEN, OR and BUT. Also includes mouthed conjunctions (typically *aber*; ‘but’).

⁶There are three lexical forms of WANT, one of which is identical to the lexical form of the verb LIKE, which is one of the verb meanings in the ValPaL list. It thus appears that this verb has grammaticalized into a modal, although it can also still be used as a standard lexical verb. In the annotations made by the DGS Corpus team, these different functions are distinguished with different ID-glosses (WANT versus LIKE). I adhered to these glosses in the annotation procedure.

- **Perf**: For the perfective marker DONE (as described in Pfau & Steinbach, 2006, who gloss the sign as ALREADY).
- **Adj**: For all types of adjuncts and adverbials. If a clause includes more than one adjunct, then every n^{th} adjunct starting from the second one is labeled 'Adj n '.
- **Part**: For particles with discourse-related functions such as PALM-UP (abbr. PU).

2.3.2.5 Nouns and adjectives

As previously noted, many verb meanings from the ValPaL list are expressed by signs that can function both as verbs and as nouns and/or adjectives. With this in mind, whenever the context of a token clearly signaled that the target sign functions as a noun or adjective, I aligned the annotation unit with just this sign or, when applicable, the noun or adjectival phrase containing the element. These units were then labeled 'N' for nominal or 'A' for adjective. I do not intend to make any claims about the nature and direction of the derivation; that is, I am agnostic with respect to whether or not these examples represent cases of nominalization or adjectivization. The main purpose of these annotations is to get an impression of (a) which signs can be used both as verbs and adjectives or nouns, and (b) the relative frequency of nominal or adjectival use vs. verbal use of a particular token.

Sometimes target signs occur in compounds that appear to have been created on the fly and which seem to have been borrowed from spoken German. These compounds are typically accompanied by a mouthing which does not always correspond to the cumulative of the individual meanings of the compound stems. Examples of this type are labeled 'N-mouth' or 'A-mouth' on the WO-tier. (7a) and (7b) present two examples.

- (7) a. 'Klassentreffen'
 CLASS MEET1
 'Class reunion' (lit. 'class meeting'). [goe03-A-02:02.35]
- b. 'Versuchskaninchen'
 SEARCH-FOR BUNNY
 'Guinea pig' (lit. 'experiment [German *suchen* = 'search'] bunny'). [lei04-B-03:12.35]

2.3.2.6 Boundaries

A prosodic boundary, for instance between a topicalized constituent and the rest of the sentence, is marked by a backslash (\). An annotation for a prosodic boundary was made when at least one of the following markers was attested in the annotation unit:

- Non-manual boundary markers
 - Head movements (change in head position)
 - Head tilts
 - Body leans
 - Overall change in non-manual behavior
- Manual boundary markers
 - Pauses
 - Holds
 - Repetitions that do not have a grammatical function (e.g. for aspect marking)

If role shift markers accompany one or more signs in the clause, everything within the scope of the role shift is placed in square brackets in the annotation. An annotation for role shift was made based on contextual cues and the presence of at least one of the following markers:

- Enhanced facial expressions
- Change in the direction of eye gaze
- Body or shoulder shifting
- Shifted indexicals (reference shift; Engberg-Pedersen, 1993)

Finally, for verb tokens that are part of a dependent clause, the scope of the annotation includes just this clause, and the annotation on the word order tier starts with a hashtag (#). When a target predicate is part of a matrix clause preceded or followed by an embedded clause, the embedded clause is labeled CO (for clausal object) on the WO-tier, but it is not included in the scope of the annotation. Dependent clauses that are not embedded, such as conditional clauses, are not labeled when the target sign is in the main clause.

2.3.3 AS-type

Annotations on the AS-type tier provide information about predicate type. This is the inventory of possible annotation values:

- I 'Body-anchored' for verbs signed on the body
- II 'Neutral' for verbs signed in the signing space
- III 'Agreeing' for agreement verbs and 'Agreeing-sp' for spatial verbs
- IV 'Classifier' for classifier predicates

The verbs of types I, II and III are lexical predicates, while the classifier predicates of type IV are not. Information about classifier predicates is represented on the AS-class and AS-meaning tiers; see Sections 2.3.8 and 2.3.9 for more details.

The categories above do not fully map onto Padden's (1988) classic classification of verb types in sign languages. Types I (verbs signed on the body) and II (verbs signed in the signing space) are collapsed into the single category 'plain verbs' in Padden's classification, while type III includes both Padden's agreement verbs and spatial verbs, the latter of which I treat as a subtype, distinguished by means of the suffix '-sp'.

Verbs are classified as body-anchored when they are articulated either on the body or close to it, and this place of articulation relative to the body is clearly iconically motivated, as with SHAVE1 (Figure 2.3a). Verb forms in which the hands represent hands or feet (Figure 2.3b) or limbs (Figure 2.3c), and which have a fixed place of articulation such that they cannot be shifted in space, are also categorized as body-anchored forms. Body-anchored verbs are extensively discussed in Chapter 4.

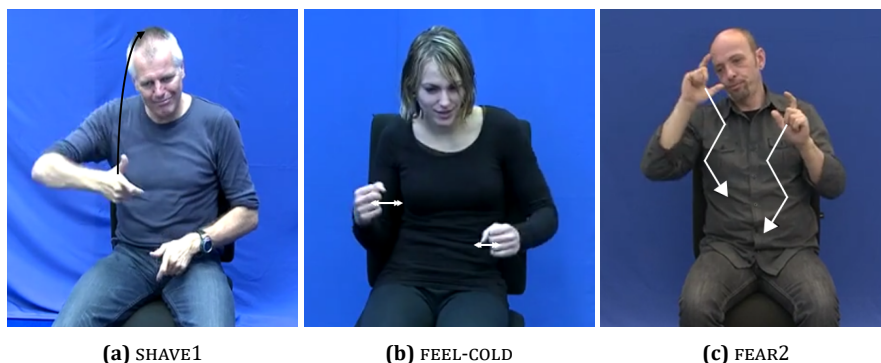


Figure 2.3: Three different kinds of body-anchored verb forms.

The category of neutral verbs includes verbs which, in their citation form, are articulated at a neutral location in the signing space, i.e. in front of the signer. They have the potential to be modified to align with the locus of a referent. Chapter 5 focuses on the properties of neutral verbs.

Verbs are classified as agreeing when they involve a path movement, which may be modified such that it aligns with loci associated with referents or locations.⁷ Verb meanings with a spatial semantics, such as *LEAVE*, are distinguished by the suffix ‘-sp’. There has been some debate about the status of these verbs, with some treating spatial verbs on a par with agreeing verbs, and others analyzing them as a separate type (see e.g. de Quadros & Quer, 2008; Janis, 1992; Padden, 1988). Chapter 6 discusses agreeing verbs, including spatial verbs, and also discusses the evidence for or against either perspective on the status of the latter in DGS.

Predicates are categorized as classifiers when they use whole-entity, handling, or body-part handshapes *and* they show variability in form, for instance in their movement trajectory, extending beyond the sort of modifications that may occur with neutral or agreeing verb forms. Section 2.4.2 discusses the methodological challenges in distinguishing between lexical and productive verbal forms.

Every verb form is consistently labeled as one of the four types. That is, whenever a verb has been established to be of type III but a specific token does not express agreement, that token is still labeled ‘agreeing’ on the AS-type tier. For further details about this procedure, see Section 2.4.3.

2.3.4 Localization and agreement tiers

On the four localization and agreement tiers, information is annotated about the modification properties of all agreeing and neutral verb tokens.⁸ Neutral verbs may be localized in space to align with the place of articulation of one argument, while agreeing verbs may be modified such that their path movement starts at a locus associated with one referent and ends at a locus associated with another referent. For the sake of simplicity, I will refer to both kinds of modification as

⁷In the literature, forms which do not have a path movement but which allow modification of the orientation of the sign have also been classified as agreeing verbs (e.g. Friedman, 1975; Meir, 1998; Valli & Lucas, 1992). There are no such verbs in the DGS data set analyzed for this dissertation.

⁸Body-anchored verbs cannot be modified, as they have a fixed place of articulation on the body.

‘agreement’ in this section, although I do not (yet) mean to make any claims about the grammatical status of these modification properties.

While annotating the data, it soon became evident that a large inventory of different labels was needed to adequately characterize the agreement properties of every verb token. Here, I describe the annotation procedure as concisely as possible; Chapters 5.3.3 (neutral verbs) and 6.3.3 (agreeing verbs) go into greater detail and also present examples illustrating the different annotation values introduced below.

For neutral verbs, annotations were made on the AS-ext-localization and AS-int-localization tiers. ‘Ext’ and ‘int’ stand for external and internal argument. Meir (1998) claims that neutral verbs in Israeli Sign Language exclusively localize at the locus associated with their internal argument.; in order to investigate whether the same pattern occurs in DGS, I independently evaluated whether the place of articulation of each neutral verb token aligns with the locus of the external and/or internal argument, when available. The distinction between external and internal arguments is normally made on syntactic grounds. However, it is not possible to verify the syntactic status of arguments in corpus data. I therefore had to let semantic considerations play into the decision process. In practice, this meant that I treated more agent-like referents as external arguments and more patient-like referents as internal arguments. For further discussion, see Chapter 5.3.3. Note that in intransitive constructions, an annotation was made on only one of the localization tiers, depending on whether I analyzed the relevant argument as external or internal. In transitive constructions, I added annotations on both tiers.

There are eight main annotation categories: they are (i) ‘localized’; (ii) ‘localized-new’ (iii) ‘congruent-a’; (iv) ‘congruent-b’; (v) ‘incongruent’; (vi) ‘unclear’; (vii) ‘default1st’; (viii) ‘default’.

Localized instances of neutral verbs are articulated at a locus that is clearly not in the center of the signing space and which corresponds to a previously introduced referent locus. When a token uses a new location in what appears to be on-the-fly localization of a referent not yet overtly assigned a locus, the annotation label ‘localized-new’ is used.

Congruent neutral verbs appear to be localized but it is unclear whether this state-of-affairs reflects the signer’s intentions. In some such cases, the argument with which the neutral verb appears to align is articulated immediately preceding the verb, such that their shared place of articulation might also be a phonological coincidence. These examples receive the annotation value ‘congruent-a’. In other

cases, both the argument and the verb are articulated at a neutral location in the center of the signing space, such that it is impossible to tell whether the neutral verb genuinely localizes or is actually used in its unmodified form. Tokens of this kind are labeled ‘congruent-b’.

‘Incongruent’ neutral verbs are articulated at a locus that clearly diverges from the locus with which the verb is expected to agree. ‘Unclear’ tokens are verbs which are articulated in the center of the signing space while the argument they are expected to agree with has not been localized at all. The label ‘default1st’ is used in the case of a first-person argument, since no localization is to be expected in such cases: neutral verbs cannot be articulated on the body.

Neutral verbs in intransitive impersonal constructions – which tend to simply be articulated in the center of the signing space – receive the label ‘default’.⁹ Since weather verbs do not take an argument and as such cannot be expected to be localized at an argument locus, these verbs also receive the annotation ‘default’. The corpus data suggest that non-specific or generic referents also typically associate with the center of the signing space. In cases where such entities are realized overtly as an argument, I simply used the annotation label ‘congruent-b’ to indicate that both the referent and the neutral verb are articulated at the center of the signing space. In (a few) other cases, the non-specific or generic entity is not overt. In such examples, I used the annotation value ‘default’ for the neutral verb rather than the label ‘unclear’, since the likelihood that the relevant referent is associated with the center of the signing space is relatively large.

When a neutral verb has clear plural marking by means of reduplication of the sign or the addition of an arc movement, or dual marking by means of the two-handed articulation of a one-handed sign, the suffix -pl is added to the annotation value (see Steinbach, 2012, for an overview of strategies used in sign languages to mark plurality).

The agreement properties of agreeing verbs at their initial and final place of articulation are annotated on the AS-1-agreement and AS-2-agreement tiers, respectively. The inventory of possible annotation values is the same as that for neutral verbs, with just a few exceptions.

Firstly, when there is agreement between the initial/final locus of the verb and the argument it is expected to agree with, the annotation label ‘agreeing(-new)’ (instead of ‘localized’) is used. Secondly, backward verbs (see Chapter 6.1) show reverse alignment in terms of subject and object marking. Therefore, the suffixes

⁹For more on this topic, see Chapter 8.3.5.

-o and -s are added to the annotations for these verbs on the AS-1-agreement and AS-2-agreement tiers, respectively. Thirdly, verbs with a spatial semantics may not necessarily agree with subjects or objects, as they might (also) agree with locations. The annotations for these verbs are always followed by any (or, in case of ambiguity, a combination of) the following suffixes: -s, -o, or -loc (for location). Fourth, some agreeing verbs, such as TEACH, may be used both transitively and ditransitively. In the former case, it is the recipient/goal argument which is not present in the argument structure, but this is also the argument that agreeing verbs would be expected to agree with. Such verb tokens turned out to be articulated at the center of the signing space; I used the annotation label 'default' to signal such cases. Finally, a handful of verbs which are classified as agreeing actually have a fixed initial or final body-anchored place of articulation. Instances of such verbs receive the annotation 'body' on the relevant tier.

2.3.5 AS-referent

The AS-referent tier encodes properties of the subject referent. Each annotation combines specifications for four parameters, namely person, number, and overt-ness of the subject, and whether there is role shift in the clause. Table 2.5 lists the parameters and their possible values. These values are combined in the order in which they are listed in Table 2.5, e.g. 10, 1Nrs, or 3pl0. In cases with action role shift, the person of the subject in the global context determines the annotation value, since the subject is always first person in the local context (see Chapter 1.2.1). Impersonal subjects are labeled '0'. With verbs that take symmetric arguments, such as MEET1, the referent that is most prominent in the context (glossed as S/O when it is overt) is considered the subject referent.

2.3.6 AS-alternation

On this tier, I made notes about intuitions or suspicions regarding possible argument structure alternations or changes that the verb in the example may participate in. Possible annotation values are e.g. 'transitive-intransitive', 'reflexive', and 'impersonal', but also 'nominalization' or 'adjectivization'. Examples with any of the final three annotation values are excluded from the analyses presented in Chapters 4, 5, and 6.

Table 2.5: Possible annotation values used to encode properties of the subject in the corpus examples.


Parameter	Values		
Person	1 <i>First person</i>	2 <i>Second person</i>	3 <i>Third person</i>
Number	- <i>Singular</i>	pl <i>Plural</i>	
Overtness	O <i>Overt subject</i>	N <i>Non-overt subject</i>	
Role shift	- <i>No role-shift markers</i>	rs <i>Role-shift markers in the clause; action role shift</i>	qrs <i>Role-shift markers in the clause; quotative role shift</i>

2.3.7 AS-comments

This is a comment tier. There are two common annotations. Firstly, unclear or ambiguous examples are labeled ‘unclear construction’ in order to enable their exclusion from analysis if so desired. Secondly, a sign was occasionally not glossed on the lexeme tiers created by the DGS Corpus team. These were typically pronominal pointing signs. In such cases, I added the missing gloss on the relevant lexeme tiers and I made an annotation on the AS-comment tier to document the change.

2.3.8 AS-class

The AS-class and AS-meaning (Section 2.3.9) tiers provide more information about the form and meaning of classifier predicates. Following the annotation conventions of the Corpus NGT (Crasborn et al., 2015), annotations on the AS-class tier encode predicate type and handshape.

Three different predicate types are distinguished. MOVE predicates indicate a path movement, and can represent independent or manipulated movement. PIVOT predicates indicate a change of position of a referent. Phonologically, this involves a change in hand orientation. AT predicates express localization of a referent. The Corpus NGT guidelines also distinguish a fourth type - BE - for classifiers without any discernible movement, localization or change in position. Such predicates often serve as a ‘background’, e.g. when a -handshape indicates a tree in front of which a person walks by. I did not annotate BE predicates in the DGS Corpus.

Handshapes are also encoded in the annotations on the AS-class tier. For instance, a 1-handshape is coded '1', while any handshape with all four fingers extended but kept together is coded 'flat' (the position of the thumb may vary). A full list of handshape codes can be found in the Corpus NGT annotation conventions (Crasborn et al., 2015).

The codes for the type and handshape of the classifier predicate are separated by a '+' in the annotation. The classifier predicate in Figure 2.4, for instance, is labeled MOVE+1.



Figure 2.4: A classifier predicate indicating an upright referent moving from one location to another, labeled 'MOVE+1' on the AS-class tier.

2.3.9 AS-meaning

Again following the Corpus NGT annotation guidelines (Crasborn et al., 2015), I included a description of the meaning of each classifier predicate on the AS-meaning tier. Since classifier predicates do not have a conventionalized meaning, this tier is merely meant to give an indication of the meaning of each predicate within the context in which it is used. For instance, the meaning of the classifier predicate in Figure 2.4 is described as 'go back'.

2.4 Methodological challenges

As with any corpus study, annotating the data goes not without its challenges. In this section, I discuss the most important issues.

2.4.1 Determining clause boundaries

Delineating clause boundaries in sign language data is not a straightforward matter. Conjunctions and complementizers are optional (Fenlon, 2010; Tang & Lau, 2012), for instance, and verbs are also not marked for tense, which – combined with the fact that many sign languages allow subject drop – additionally makes it difficult to distinguish between full and infinitival complement clauses (Geraci & Aristodemo, 2016). The matter is not helped by the scarcity of literature on clause diagnostics, although some recent works discuss a range of semantico-syntactic tests (see Loos, 2017, for an evaluation of old and new diagnostics). However, such diagnostic tests cannot be applied to corpus data.

I therefore had to rely on semantic and prosodic cues in the delineation of the examples.¹⁰ I determined for each token which signs surrounding the verb semantically looked like arguments, and subsequently whether or not these potential arguments are separated from the verb by prosodic boundaries. When such boundaries are present, I assessed whether they signal a clause boundary or something else, such as topicalization. I went through the same process for other types of constituents, although whether or not these elements are justifiably included in the annotation unit is less crucial for the purposes of this dissertation.

If there were any other predicates close to the target verb, I assessed whether there was any semantic or prosodic indication that they formed a type of multiple verb construction. I evaluated whether the events denoted by these verbs involve the same participants, and whether any prosodic cues – such as a change in the direction of eye gaze, a pause, or a hold – appear to signal multiclausality. If not, I classified the example as a clause involving multiple verbs, and I annotated the second verb on the word order tier as *V*, *V2* or *V-comp* according to the guidelines described in Section 2.3.2.1.

In some cases, an argument was sandwiched in between two verbs, where semantically it could belong to either one. In such cases, I had to rely on prosodic cues.

¹⁰Hansen and Heßmann (2007) provide support for such a method. They show that a meticulous, systematic, functional analysis performed on a short sample text in DGS yields results largely similar to a more intuitive analysis. They additionally demonstrate that a variety of prosodic markers, such as eye gaze, head nod, and the discourse marker *PALM-UP*, are able to signal a clause boundary, but not consistently or exclusively. Thus, a combined approach, taking both semantic and prosodic signals into account, seems to be the best way to go.

2.4.2 Lexical verbs and classifier predicates

Some verb meanings from the ValPaL list easily lend themselves to being expressed with classifier predicates. They tend to be meanings that entail a movement or the causation of a movement, such as SINK, JUMP, or CARRY, or the manipulation of an object, such as CUT, BREAK or TEAR. However, not *all* of these meanings are conveyed (only) by classifiers; some of them are (also) expressed by lexical verbs.

Take the verb meanings SIT DOWN and SIT. One might reasonably expect that both these meanings are represented with classifiers in DGS. Closer inspection of the data, however, reveals that the static event of *sitting* is always expressed in the same way, namely with two ✎-handshapes – palms toward the signer – moving slightly downward in neutral space (Figure 2.5). It appears that this is a lexical(ized) sign, since its form is not dependent on characteristics of the subject, and its movement is not dependent on the subject's movement.

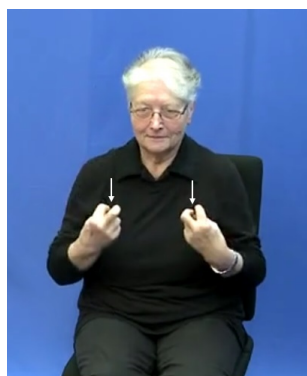


Figure 2.5: An instance of the lexical sign SIT.

Interestingly, the dynamic event of *sitting down* is expressed with a predicate with the same handshape as SIT, but the movement can be modified to express the location at which the event takes place (Figure 2.6), sometimes combined with an arc movement to indicate a trajectory. The predicate is usually signed with one hand, except when multiple referents are involved, in which case both hands may be used to indicate plurality. In contrast, the lexical form in Figure 2.5 involves two hands but nonetheless refers to a single entity.

For SIT versus SIT DOWN, we can thus make a neat distinction between the conventionalized verb and the productive classifier predicate. However, I was unaware of this difference at the start of the annotation process, meaning that I later



Figure 2.6: An instance of the classifier predicate CL(SIT-DOWN).

had to make a post-hoc judgment. In practice, this entails that I occasionally had to change the annotations on the AS-verb tier. This also happened with the verb meanings BREAK (a classifier and a lexical sign) and BUILD (a lexical sign). Occasionally, there were too few tokens per verb meaning to come to any meaningful conclusions, such as with a couple of predicates denoting the verb meanings COVER and LOAD. I still annotated tokens representing these meanings, making an informed guess about their category (classifier predicates), including a note on the comment tier to indicate the uncertainty.

2.4.3 Labeling constituents

For a variety of reasons, determining parts of speech in sign languages is a fairly complicated task (Zeshan & Schwager, 2008). For one, there has simply been very little research in this area, the exception being a handful of studies on the noun-verb distinction in a few sign languages (see e.g. Supalla and Newport, 1978 for American Sign Language; Johnston, 1989, 2001 for Australian Sign Language; Kimmelman, 2009 for RSL). There are few tried-and-tested part-of-speech diagnostics, and even when they have been reported, they could be language-specific (Loos, 2014).¹¹ And in any case, syntactic tests cannot be applied to corpus data.


A number of properties shared by many sign languages contribute to the complexity of the task. First, morphology that could help signal parts of speech, such as tense marking on verbs, often does not occur in sign languages. When there is some form of marking, it tends to be optional. For instance, Kimmelman (2009)

¹¹Also see Börstell, Hörberg, and Östling, 2016 for a discussion of the relation between parts of speech and sign duration in Swedish Sign Language.

shows that repetition of movement may distinguish noun-verb pairs in RSL. However, not *all* noun-verb pairs are distinguished in this way, and those that are, are not marked consistently or by every signer. Kimmelman (2009) speculates that principles of economy and iconicity may explain this variation. Secondly, sign languages do not have copular verbs, so these cannot be used as a diagnostic for a predicate's adjectival status. In example (8), for instance, it is impossible to determine whether BE-DEAF is a verbal or an adjectival predicate – if sign languages make such a distinction to begin with (Loos, 2014; Zeshan & Schwager, 2008).

- (8) INDEX₁ **BE-DEAF**
 'I am deaf.' [stu03-A-07:20.00]

As a rule of thumb, tokens that reflect one of the verb meanings from the ValPaL list are always treated as verbs, unless there is good reason to assume that they function as adjectives (9a) or nouns (9b). In many cases, such as in example (9a), mouthings provide an additional cue regarding the grammatical category of a sign.

- (9) a. 'ununterbrochen'
 UN U-N **BREAK**
 'I joined everything] without interruption.'¹² [ber04-B-07:10.25]
- b. PEOPLE **DRINK** CL():POUR
 'Those were the people who bartended.' [lit.: 'Those were the people who poured drinks.'] [fra01a-B-01:20.00]

Thirdly, constituent order is relatively flexible in sign languages, and the factors that influence it are poorly understood, thus making it an unreliable cue for determining a sign's category. Compare examples (10a) and (10b), for instance. Disregarding the non-manual markers (which are not relevant here), the examples are very similar: they start with the verb KNOW₁ and are followed by a pronominal pointing sign. However, the contexts in which the examples occur indicate that the pointing sign is the subject in (10a), while it is the object in (10b). As such, I had to let the semantic context, sometimes in combination with prosodic cues, guide the labeling process (see Hansen & Heßmann, 2007).

- (10) a. $\frac{\text{hs}}{\text{KNOW}_1 \text{ INDEX}_1}$
 'I just can't imagine [it].' [lei02-A-02:17.00]

¹²UN is a morpheme sign likely originating from Signed German.

- b. $\frac{\text{hn}}{\text{KNOW}_1 \text{INDEX}_a}$
 ‘Yes, [I] know it.’ [mst10-A-15:06.00]

Examples (11a) and (11b) illustrate another common problem. DIRTY DUST in (11a) and GOAL in (11b) could function as direct objects (i), but also as clausal objects (ii). As a rule, if I could not observe an obvious change in prosodic signals to mark a transition between a matrix clause and an embedded clause, I labeled the relevant constituent O instead of CO. If the prosodic signals were unclear or ambiguous, I simply used the combination label O/CO.

- (11) a. ALSO TELEVISION **SHOW**₁ DIRTY DUST
 i. ‘The TV showed huge dust clouds.’
 ii. ‘The TV showed that there were huge dust clouds.’
 [hh03b-A-04:07.00]
- b. CAN **HEAR** GOAL
 i. ‘I could hear the goal.’
 ii. ‘I could hear that a goal was being scored.’ [ber12b-A-05:33.65]

2.4.4 Non-overt arguments and subject demotion

As in other sign languages, subjects and objects can be non-overt in DGS. An example with two null arguments is presented in (12). Recall from Section 2.3.5 that null subjects receive the label ‘N’ on the AS-referent tier.

- (12) **LIKE** NOT
 ‘[He] didn’t like [it].’ [lei04-B-07:04.50]

Such examples need to be distinguished from examples that include impersonal subjects, as in the examples in (13). Clauses with impersonal subjects receive the annotation ‘0’ on the AS-referent tier to indicate that the subject is non-overt but that it is also not specified.

- (13) a. **SUDDENLY** CELLPHONE **SEND**₁
 ‘I was suddenly sent a text.’ [lei15-B-00:14.00]
- b. **CULTURE** **SHOW** LITTLE-BIT PU
 ‘[They] showed [too] little of the cultural aspects.’ [hb04-B-10:00.50]
- c. **STEAL+++** **VERY**
 ‘A lot got stolen.’ [stu17-A-03:35.25]

Whether examples involve null arguments or impersonal arguments was determined primarily based on the context, i.e. by determining whether any referents have been introduced in the context that might serve as arguments to the verb. In the case of agreeing verbs and neutral verbs, lack of modification of the token turned out to be an additional cue to signal an impersonal subject. Chapter 8.3.5 discusses impersonal constructions in the data.

2.4.5 (Lack of) negative evidence

A limitation of corpus data is that they cannot offer insight into which constructions are *not* grammatical in a language: the absence of a particular construction in a corpus data set does not entail that it is ungrammatical. For much of the research described in the next chapters, this issue is irrelevant either because I am merely interested in general tendencies and patterns (e.g. with respect to constituent order) or because (un)grammaticality is not at stake (e.g. in the description of recurring iconic form-to-meaning patterns). However, in two cases in particular, elicited data turned out to be of importance.

Firstly, for some verb forms, it seemed plausible that they might be able to participate in particular argument-structure alternations, yet they only occurred in constructions representing one half of the alternation in the corpus data. Secondly, for some verb types, the data could not show clearly what their modification properties are. Verbs that are articulated in the center of the signing space in their citation forms, which I call ‘neutral verbs’, hardly ever occurred in modified form to express agreement, despite several claims made for other sign languages that such localization is possible. A factor that appeared to be at play in the DGS data is that neutral verbs that are used transitively frequently take an inanimate object, and such referents appear to resist localization at a non-central location in the signing space except under certain pragmatic conditions. However, based on the corpus data alone, it is difficult to draw any definitive conclusions. A similar issue arose with spatial verbs, for which some of the modification patterns described in the literature also did not show up in the data.

In order to partially overcome these limitations, I collected some complementary data with two native signers of DGS. The procedure of these data elicitation sessions is described in the next section.

2.5 Data elicitation: informants and procedure

I elicited data from two informants to gain better insight into (i) valency patterns with particular verb forms, and (ii) modification abilities of neutral verbs and spatial verbs. The informants 1 and 2 are both male deaf signers of DGS aged 37 and 45, respectively. Informant 1 indicated he has deaf parents; informant 2 also has deaf family members but did not specify the family relations. Informant 1 indicated that the region he is from, defined as the region he identifies most closely with and/or has spent the most time at, is Nordrhein-Westfalen, which is in the west of Germany. The second participant chose not to disclose what region he is from. Both informants received 5 euros per fifteen minutes for their participation in the study.

The data elicitation sessions, both of which took approximately an hour, took place at the Sign Lab of the Georg-August-Universität Göttingen in the spring of 2019. The sessions consisted of three parts. In the first part, informants were presented with verb forms in isolation in order to verify whether (i) they were familiar with them, and (ii) they used those forms in their daily signing. The verb forms that were presented all represented verb meanings from the ValPaL list and thus occurred in annotated constructions in the corpus data. Forms for which the informants indicated that they did not recognize and/or use them themselves were not used in the next two parts of the session.

In part two, I signed constructions containing verbs for which I wished to check what their valency options were. Two examples with the form BE-DRY3 are represented in (14). Equivalents of the first but not the second construction type were attested in the corpus data; the aim was to verify whether the second (resultative) construction was judged to be grammatical by the signers. Informants were instructed to repeat the sentences they were shown, and they were also told that they could add non-manual markers and/or modify the sign order if they felt that would make the construction more natural. They were then asked to judge the modified construction by indicating (i) whether the construction felt natural, and (ii) whether they would use such a construction themselves. When the informants deemed a particular construction unnatural, they were asked to explain why. In cases in which ambiguity was a possibility, for instance because the intended subject and object might have been interpreted as a single argument, I directly asked the informants how they interpreted the sentence.

- (14) a. FOOD BE-DRY3
Intended meaning: 'The food is/was dry.'
- b. MAN POTATO BOIL BE-DRY3
Intended meaning: 'The man boils/boiled the potatoes dry.'

In part three, I showed sets of sentences that differed with respect to where the verb was localized in the signing space. An example set with the neutral verb COOK1 is represented in (15).¹³ COOK1 is a verb that may be used both in intransitive (unspecified-object) constructions and regular transitive constructions. With the sentences in (15a) and (15b), I aimed to test whether COOK1 may be localized at the locus associated with the subject (as in (15b)) when the verb is used intransitively, or whether it must be localized in the center of the signing space. The sentences in (15c) and (15d) were meant to verify the same pattern in transitive constructions with an object, which is articulated at the center of the signing space.

- (15) a. FATHER INDEX_a COOK1_c
b. FATHER INDEX_a COOK1_a
c. FATHER INDEX_a PASTA_c COOK1_c
d. FATHER INDEX_a PASTA_c COOK1_a

Both informant sessions were recorded with two cameras: one directed toward the informant and one directed toward me. The recordings, in combination with notes made during the session, were subsequently used for analysis. The results are discussed in Chapters 4 to 6 wherever they are relevant.

2.6 Summary

In the sections above, I described the annotation procedure for the 58 dialogues selected from the DGS Corpus, and I discussed some of the challenges I encountered along the way. I identified and annotated clauses with verbs representing meanings from the ValPaL list (Hartmann et al., 2013). The newly created annotations include information about constituent order, verb type, agreement, the subject, possible alternations, and, for classifier predicates, classifier type and

¹³The subscript 'c' refers to articulation of a sign in the center of the signing space; the subscript 'a' refers to a non-central place of articulation.

meaning of the predicate. The full set of annotated examples forms the basis for the research presented in all subsequent chapters. Some additional data elicited from two DGS signers complement the corpus data.

CHAPTER 3

Verb types and semantic maps

VERBS in sign languages are commonly classified based on their agreement properties. Typically, a distinction is made between agreeing or agreement verbs and spatial verbs – which agree with person/location – and plain verbs – which do not agree (see e.g. de Quadros, 1999; Janis, 1992; Meir, 2002; Padden, 1988; also see Chapter 1.2.3).¹ It has additionally been suggested that this classification is semantically grounded: agreement verbs have been claimed to denote transfer, spatial verbs motion, and plain verbs neither of the two (Meir, 1998, 2002). Given the – typologically singular – proposition that the verb agreement system in sign languages is rooted in semantics, it is perhaps surprising that details of the semantics of different verb types have not been explored in much more depth beyond what Meir (1998, 2002) has offered. Therefore, the aim of this chapter is to gain a deeper understanding of the semantic underpinnings of verb types.

I start from the intuition that there is an intricate connection between transitivity and sign language verb type, which is governed by particular properties of events and their participants. The central hypothesis is that verb semantics impacts on sign language verb type similar to the way in which it affects case-marking for transitivity in spoken languages (following e.g. Hopper & Thompson, 1980; Tsunoda, 1981). If there is any truth to this hypothesis, then it should be possible to apply methods that have been used to investigate transitivity in spoken languages to sign language data. This is what I set out to investigate.

I outline my approach in more detail in Section 3.1. I then briefly discuss some quantitative results from the DGS corpus data in Section 3.2. I introduce the semantic map approach I will use in Section 3.3 and subsequently apply a semantic map for transitivity splits (Malchukov 2005; Section 3.4) to the German Sign Language (DGS) data. The results are reported in Section 3.5. The exercise culminates in the formulation of a number of generalizations and predictions about verb types across sign languages (Section 3.6).

The present chapter sets the stage for the rest of the dissertation: in Chapters 4, 5, and 6, I zoom in on the semantic, morphophonological and morphosyntactic properties of each of the three verb types discussed in more general terms here. Chapter 7 compares the findings collected for the different verb types, on the basis

¹Exceptions tend to be so-called shared sign languages, which are used by both deaf and hearing members of communities with a high incidence of hereditary deafness (Kisch, 2008; Nyst, 2012). Examples are Al-Sayyid Bedouin Sign Language (Aronoff, Padden, Meir, & Sandler, 2004; Meir et al., 2007) and Kata Kolok (De Vos, 2012; Marsaja, 2008), which do not possess agreeing verbs.

of which a formal analysis is proposed in Chapter 8.

3.1 Verb semantics, verb type, and transitivity

In this chapter, I entertain the idea that the realization of sign language verbs as distinct types is mediated by the same semantic properties that influence the selection of case as an indicator of the transitivity of verbs in spoken languages. A fundamental insight leading to this hypothesis is that – since prototypical agreeing verbs in sign languages are defined by their ability to agree with two arguments – they necessarily denote events involving (at least) two participants by default. Indeed, (Meir, 1998, 2002) claims that agreement verbs semantically express transfer, which aligns rather well with the traditional view of prototypical transitivity as “a matter of [...] *transferring* an action from one participant to another” (Hopper & Thompson, 1980:253, emphasis added).

It is not a coincidence, of course, that agreeing verbs tend to denote concepts involving transfer: the path movement that most agreeing verbs possess appears to iconically represent such a relation. But a transfer relation is not the only semantic feature that can be expressed in an iconic manner; the visuo-spatial nature of the signed modality creates a vast array of possibilities in this regard. Thus, I hypothesize that particular constellations of iconically motivated properties increase the likelihood of a verb to be of a certain type.

To give a concrete example, the verb meaning FEAR denotes a psychological state, of which one of the main hallmarks is that it involves (at least) an experiencer. As previously pointed out by Meir et al. (2007) and Oomen (2017) (see Chapter 4.1 for further discussion), the signer’s body may come to iconically represent this experiencer through body-anchoring. Indeed, the DGS verb forms FEAR1, FEAR2, and FEAR3 are all body-anchored (Figure 3.1).²

But there are other properties of verb meanings that may be conveyed in an iconic manner. For instance, fear is caused by a certain stimulus or trigger. In the three body-anchored forms in DGS, this aspect of the verb’s meaning is not represented through an iconic form-to-meaning mapping. However, it is not unthinkable that a form would make reference to this event participant. Indeed,

²Figures 3.1b and 3.1c are analyzed as body-anchored verbs because the hands represent the legs and the hands of the experiencer (represented by the signer’s body), respectively. For details about the classification procedure, I refer the reader back to the annotation guidelines described in Chapter 2.3.3.

there are sign languages with psych-verbs that can agree with two arguments. The verb HATE in Israeli Sign Language (ISL) is of this type (Meir, 1998): it has a path movement from experiencer to stimulus.³ While we may expect both intra- and crosslinguistic variation with respect to which aspects of events are highlighted in individual verb forms, the premise on which the present study is built is that the variation is not random.

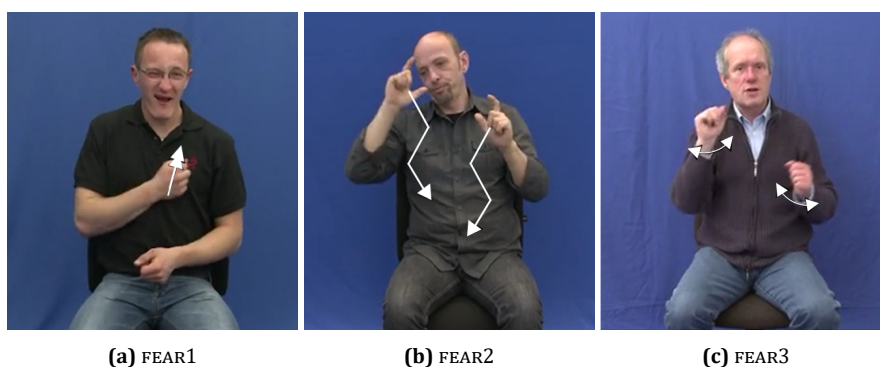


Figure 3.1: Three lexical forms denoting FEAR in DGS.

Significantly, properties of events and their participants are also known to govern case-frame selection as an indicator of transitivity in spoken languages. Here, I define transitivity as a gradable and semantically multifactorial notion following Hopper and Thompson (1980). That is, verbs denoting concepts that involve many properties associated with a high degree of transitivity are more likely to occur in a transitive (e.g. nominative/accusative) case-frame than verbs with fewer such properties (see Section 3.4 for further discussion).

The hypothesis that the same semantic properties that govern case-frame selection in spoken languages also affect verb type in sign languages is visualized in the model represented in Figure 3.2. The left side of the figure indicates that verbs are lexically specified for semantic information, including properties of the events they denote and their participants. These properties govern sign language verb type (upper right) – at least partially due to iconically motivated form-to-meaning mappings – but they also affect case-frame selection, associated with

³In fact, informal discussion with an informant indicated that HATE in DGS behaves like a ‘hybrid’: it has a fixed initial body-anchored place of articulation, while its final place of articulation may be adapted to align with that of the object. Similar hybrid forms found in the corpus data are discussed in Section 3.5.6.

different degrees of transitivity, in spoken languages (lower right). As a result, semantic overlap is expected to occur between verbs that select particular case-frames in spoken languages and verbs of particular types in sign languages.⁴

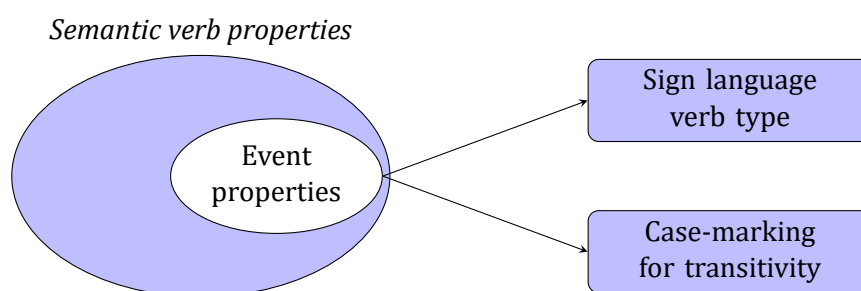


Figure 3.2: A model representing how verb semantics is predicted to affect formal verb properties in signed and spoken languages.

The assumption of overlap between signed and spoken languages as discussed above is crucial, as it motivates the application of a semantic map for transitivity splits (Malchukov, 2005; Section 3.3), intended to characterize the semantic patterns underlying these splits, to the DGS data. If the connection between sign language verb type and spoken language case marking exists, it should be possible to identify meaningful patterns from this procedure. If the two phenomena are unconnected, on the other hand, then the results for DGS can be expected not to make any sense.

A semantic map makes predictions about the multifunctionality of grammatical elements. In this chapter, I treat different verb types as distinct grammatical elements, too. More precisely, I consider the (optional) directionality of agreeing verbs (including spatial verbs), the body-anchoring of body-anchored verbs, and the potential for localization of neutral verbs to be grammatical markers.⁵ As such, I am making predictions about the sort of events that verbs of these different types may denote, where the semantic event categories are understood as functions, in line with Haspelmath (2003). If sign language verb type and spoken language transitivity marking are indeed governed by the same semantic properties, then

⁴With this, I do not intend to claim that the properties of the different sign language verb types are a form of case-marking – although such an analysis is a possible way to go, and one that plays a part in Meir’s (1998) analysis of agreement verbs.

⁵Chapters 4, 5 and 6 discuss these properties in more detail. Hybrid forms (Section 3.5.6) possess a mix of these qualities.

there should, in principle, be no violations of the predictions that Malchukov's (2005) semantic map makes.

Independent of whether or not the DGS data obey the restrictions the map imposes, using the map to classify DGS verb forms makes it possible to evaluate the semantic profiles of different verb types. Do the results align, for instance, with Meir's (1998, 2002) characterization of agreement verbs as verbs of transfer, spatial verbs as verbs of motion, and plain verbs as anything else? The analysis in this chapter thus contributes toward a more precise characterization of the underlying semantics of the sign language verb type system.

If the map indeed turns out to be applicable to the DGS data, then that puts us in a position to make further predictions about the scope of cross-linguistic variation and diachronic change. Previous studies on Danish Sign Language (DTS; Engberg-Pedersen, 1993), ISL (Meir et al., 2007; Meir, 2012, 2016), and also DGS (Pfau et al., 2018), for instance, have reported on the diachronic development of a subset of verbs from body-anchored forms to forms that agree. With the use of a semantic map, sophisticated predictions can be made about the pathways along which such changes may occur.

In the next section, I first describe some quantitative facts about the data on which the analysis in the present and all subsequent chapters will be based.

3.2 Some quantitative results

A total of 1847 clauses with signs representing verb meanings from the ValPaL list (reproduced in Table 3.1 from Table 2.2) were identified in the corpus data and subsequently annotated according to the guidelines described in Chapter 2.⁶ I did not find lexical verb forms for all of the verb meanings: some meanings (N=16; gray cells) were represented in the data by non-lexical classifier predicates only, while no examples were attested at all for several other verb meanings (N=6; strikethrough). A number of verb meanings (N=9) could be expressed both with classifier predicates and lexical signs; these are marked in the table with a star. The 299 examples that include a classifier predicate are not analyzed in detail in this dissertation, although the semantics of these predicates are very briefly discussed in Section 3.5.5.

⁶Instead of tokens representing the predicative meaning 'be a hunter', I searched for predicates with the meaning 'be deaf'; see Chapter 2.3.1.

Table 3.1: The ValPaL verb meaning list. Verb meanings in gray cells are exclusively conveyed by classifier predicates in the data. Verb meanings followed by a star can be expressed both by lexical signs and by classifier predicates. For verb meanings with a strikethrough, no tokens were identified in the data set.

Meaning labels			
ASK FOR	DRESS	LEAVE	SHAVE
BE A HUNTER	EAT*	LIKE	SHOUT AT
BEAT	FEAR	LIVE	SHOW
BE DRY	FEEL COLD	LOAD	SING
BE HUNGRY	FEEL PAIN	LOOK AT	SINK
BE SAD	FILL	MEET	SIT
BLINK	FOLLOW	NAME	SIT DOWN
BOIL	FRIGHTEN	PEEL	SMELL
BREAK*	GIVE*	PLAY	STEAL
BRING	GO*	POUR*	TAKE*
BUILD	GRIND	PUSH	TALK
BURN	HEAR	PUT	TEACH
CARRY	HELP	RAIN	TEAR
CLIMB	HIDE*	ROLL	TELL
COOK	HIT	RUN*	TIE
COUGH	HUG	SAY	THINK
COVER	JUMP	SCREAM	THROW*
CUT	KILL	SEARCH FOR	TOUCH
DIE	KNOW	SEE	WASH
DIG	LAUGH	SEND	WIPE

Excluding the 299 examples with classifier predicates, 1544 examples with 106 verb forms representing 58 verb meanings remain.⁷ All of the lexical forms are listed in Table A.1 in Appendix A; an excerpt from the table is shown in Table 3.2. Lexical variants denoting the same meaning are distinguished by means of a number suffix, e.g. SEND1 and SEND2. Antonyms and other semantically related signs that do not qualify as synonyms are indicated by separate glosses, e.g. BE-HUNGRY and BE-THIRSTY. The fourth column in the table indicates verb type; the fifth indicates the number of identified tokens per form, with the number of nominal and adjectival uses in brackets (not included in the regular token count).

To reiterate from Section 2.3.3, the verb type classification I adhere to slightly deviates from the most commonly employed classification originally proposed by

⁷Remember that verb meanings may be represented by multiple lexical forms; see Chapter 2.3.1 for further details.

Table 3.2: An excerpt of the table in Appendix A.1, providing information about lexical verb forms identified in the DGS corpus that represent verb meanings from the ValPaL list.

#	Verb meaning	Lexical signs	Verb type	Freq.
1	ASK FOR	ASK-FOR	body-anchored	4 (-)
2	BE A HUNTER	BE-DEAF	body-anchored	37 (-)
3	BEAT	BEAT	agreeing	10 (4)
4	BE DRY	BE-DRY1	neutral	1 (-)
		BE-DRY2	neutral	1 (2)
		BE-DRY3	neutral	2 (-)
		BE-WET	neutral	2 (-)
5	BE HUNGRY	BE-HUNGRY	body-anchored	1 (-)
		BE-THIRSTY	body-anchored	1 (-)

Padden (1988). Firstly, I make a distinction between ‘body-anchored verbs’ and ‘neutral verbs’, while Padden groups these together in the ‘plain verb’ category.⁸ Secondly, I collapse Padden’s agreement verbs and spatial verbs into the single category of ‘agreeing verbs’ (in line with de Quadros & Quer, 2008; Janis, 1992, 1995), although the two types are still distinguished by means of the suffix ‘-sp’ which is added in the case of verbs with a spatial semantics (see Chapter 2.3.3). The semantic map method can help determine whether this alternative classification is justified on semantic grounds.

Note in Table A.1 that different forms representing the same verb meaning occasionally differ in type. DIE1 is a neutral verb, for instance, while DIE2 and DIE3 are both body-anchored verbs. Such cases are marked in gray in the verb type column.

In total, there are 713 examples with 51 body-anchored verb forms, 524 with 24 agreeing verb forms (including six spatial forms), and 307 with 31 neutral verb forms, but these numbers include 200 nominal and adjectival uses of verb forms as well as 281 constructions with impersonal subjects, which I am excluding from further analysis (but see Chapter 8.3.5 for a brief discussion of impersonal constructions in DGS). Subtraction of these examples yields a final data set including 555 examples with body-anchored verbs, 335 with agreeing verbs, and 195 with neutral verbs. The analyses in each of the subsequent chapters are based on this set of 1,085 examples of verbal constructions.

⁸Actually, it is not quite clear where Padden stands on the issue of what Costello (2015) has coined ‘single-argument agreement verbs’, i.e. neutral verbs that can localize to align with an argument locus. See Chapters 4.1 and 5.1.1 for details.

3.3 A semantic map approach

Semantic maps are a fairly new tool in the field of typology and are used to represent the multifunctionality of grammatical elements in a network (Haspelmath, 2003). They are intended to broaden our understanding of structural – and potentially universal – semantic patterns by organizing semantic categories in a network in such a way that multifunctional linguistic elements occupy contiguous spaces on the map. Grammatical elements often have more than one conventionalized meaning or contextually determined use, and, uncoincidentally, these different functions are frequently related semantically or otherwise.⁹ A semantic map is a way to chart the various functions of grammatical elements with the aim of making cross-linguistic predictions about their scope.

When constructing a semantic map for a particular domain, a sample of typologically diverse languages has to be studied in order to identify functions that can be expressed by the same grammatical markers, and vice versa. The functions subsequently have to be arranged in a semantic map such that for each language, every marker covers a contiguous area (Haspelmath, 2003). As such, a semantic map expresses implicational universals: if a particular marker in a language expresses function A and function C, it should also express intervening function B.

As an example, consider Figure 3.3, which is a reproduction of a semantic map proposed by Boye (2010). The various boxes represent epistemic meaning categories organized along two dimensions. The upper strand includes categories concerning source of information, while the lower strand encompasses classes involving different degrees of uncertainty.¹⁰ The map is constructed based on data from 52 languages representing 35 top-level language families (phyla). The connecting lines represent hypotheses about polyfunctionality. To give an example, a polyfunctional marker indicating both direct evidence and certainty would be expected to be possible in a language because these categories are connected on the map. In contrast, a marker expressing only direct evidence and partial (un)cer-

⁹The term ‘function’ is intended to capture both conventionalized meanings and contextually determined uses of grammatical elements (Haspelmath, 2003). Similarities in function are often rooted in semantics, but not always; functions can also be differentiated pragmatically (Hengeveld & van Lier, 2010) or syntactically (Haspelmath, 1999), for instance.

¹⁰Boye (2010) points out that finer-grained categories are possible for some of the categories on the map. For instance, the category ‘direct evidence’ includes the linguistically significant (i.e. distinguishable) subcategories ‘visual’, ‘auditory’ and ‘unspecified’ direct evidence. They have been left out of the map for the sake of simplicity.

tainty/probability would be unexpected, since intervening categories are present. The map additionally predicts that diachronic change must occur along the pathways indicated in Figure 3.3, although it cannot predict the direction of change.

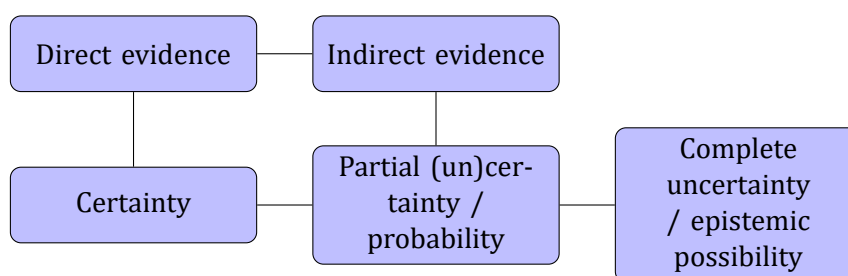


Figure 3.3: A semantic map of epistemic evidentiality (Boye 2010), reproduced with minor adaptations.

An advantage of a semantic map is that it does not presuppose prototypical functions for grammatical markers. Instead, it considers fine-grained semantic distinctions and places them in a network, which facilitates the process of drawing cross-linguistically valid conclusions about a wide variety of linguistic phenomena – even and especially in particularly complex domains with much cross-linguistic variation.

Since the verb-type system in sign languages appears to be at least partially rooted in semantics, a semantic map may be a valuable tool for characterizing sign language verb types. At the same time, verbs with similar semantics can be of different types across sign languages. A semantic map in which the agreement properties of verb types are regarded as polyfunctional markers that cut across semantic domains is particularly apt to characterize the potential for such differences. Furthermore, such a map allows us to make predictions about diachronic change in verb type membership.

Following Haspelmath's (2003) guidelines, one would need to study at least a dozen sign languages in order to draw a typologically meaningful map, but such an enterprise falls outside the scope of the current investigation. I therefore apply an already existing map for transitivity splits (Malchukov, 2005) to the DGS data. The rationale behind this has been explained in Section 3.1: it is hypothesized that the same semantic properties have a mediating role in both domains. The next section introduces Malchukov's semantic map.

3.4 A semantic map for transitivity splits

According to Hopper & Thompson (1980), transitivity is a gradable notion resulting from the interaction between a range of semantic and morphosyntactic features. This sentiment is captured in the Transitivity Hypothesis:

If two clauses (a) and (b) in a language differ in that (a) is higher in Transitivity according to any of [a set of] features, then, if a concomitant grammatical or semantic difference appears elsewhere in the clause, that difference will also show (a) to be higher in Transitivity. (Hopper & Thompson, 1980, p. 255)

The Transitivity Hypothesis predicts that all features that are marked in a clause need to be either high or low in value. Features are parametric and include parameters such as agency, mode, and affectedness of the object. They can manifest as morphosyntactic marking and/or semantic interpretations.

To give a concrete example, Hopper and Thompson (1980, p. 253) observe that the sentences in (1a) and (1b) differ with respect to several parameters, namely *kinesis* (i.e. eventivity), *aspect* (i.e. telicity), *punctuality*, *affectedness of O*, and *individuation of O* (a cluster of properties related to the referential distinctness of O).¹¹ The Transitivity Hypothesis predicts that the more transitive clause of the two (1b) should have feature specifications for the parameters listed above that are higher (or at least not lower) in transitivity value than the specifications of the less transitive clause (1a), which the authors show is the case.

- (1) a. Jerry likes beer.
b. Jerry knocked Sam down.

Hopper and Thompson (1980) observe a number of different morphosyntactic strategies that languages may employ to signal transitivity, including case-marking, verbal inflection, differences in constituent order, and noun incorporation. The examples from Chukchee in (2), originally from Comrie (1973) and discussed in Hopper and Thompson (1980), illustrate several of these types of markings. Firstly, the highly transitive sentence in (2a) has ergative case-marking on A and absolutive case-marking on O, while the sentence in (2b) – which is low in

¹¹Following Dixon (1979), O stands for Object, which is the more patient-like argument in a two-participant clause. A stands for Agent.

transitivity – has nominative case-marking on A.¹² Secondly, the verb and O are separate words in (2a), while O is incorporated into the verb in (2b). Finally, in (2a), the verb takes a dedicated transitive suffix, but it takes an intransitive suffix in (2b).

- (2) a. tumg-e na-ntəwat-ən kupre-n Chukchee
 friends-ERG set-TRANS net-ABS
 ‘The friends set the net.’
- b. tumg-ət kopra-ntəwat-gʔat Chukchee
 friends-NOM net-set-INTR
 ‘The friends set nets.’

While Hopper and Thompson (1980) investigate transitivity as a property of the clause, Tsunoda (1981, 1985) argues that the notion of transitivity as a multifactorial property also holds at the lexical level, as manifested in structural case-marking systems. In other words, transitivity alternations (clause level) and case splits (lexical level) are argued not to be fundamentally different from each other: they are governed by the same principles. Tsunoda (1981, 1985) arranges different semantic verb classes in an implicational hierarchy (3) in which verb classes toward the left of the hierarchy are purported to be more transitive across languages than those toward the right. This should then be reflected in the lexical selection of case-frames: in any language where verbs of a certain semantic class allow for a particular case-frame, verbs in classes toward the left of this class should allow for it as well.

- (3) Direct effect (*kill*) » Perception (*see*) » Pursuit (*wait*) »
 Knowledge (*forget*) » Feeling (*need*) » Relation (*possess*)

Malchukov (2005) argues that Tsunoda’s hierarchy conflates two dimensions and makes an effort to disentangle them with the two-dimensional hierarchy represented in Figure 3.4. The hierarchy is constructed on the basis of data from the eight typologically diverse languages discussed in Tsunoda (1985) and further tested against data from several other languages. Note that the hierarchy is implicational, but with an important qualification: it predicts that if *some* – not all – members of a certain verb class take a transitive pattern, then at least some members of a semantically higher class should do so, too.

¹²Glossing in (2) according to Leipzig Glossing Rules. Legend: ERG = ergative; TRANS = transitive; ABS = absolutive; NOM = nominative; INTR = intransitive.

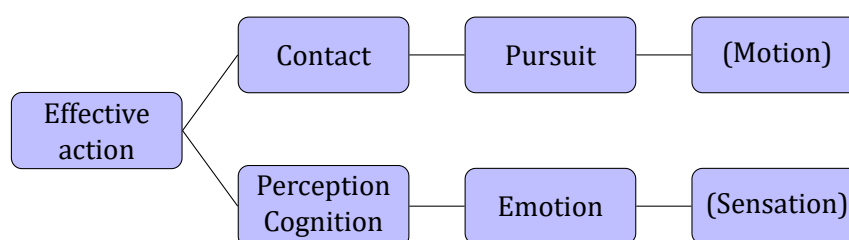


Figure 3.4: Two-dimensional transitivity hierarchy (Malchukov, 2005).

The strand in Figure 3.4 that runs from ‘Effective action’ to ‘Motion’ orders verb classes according to decreasing levels of patienthood of O. Compare ‘kill’ (Effective action) or ‘hit’ (Contact) with ‘search’ (Pursuit) or ‘leave’ (Motion), for instance. The lower pathway from ‘Effective action’ to ‘Sensation’ sorts verb classes according to decreasing agentivity of A as well as decreasing affectedness of O. In other words, A becomes increasingly more like an Experiencer, while O becomes increasingly more like a Stimulus or Causer.

To give an example, Malchukov (2005) discusses that in languages such as English and German, verbs of pursuit typically take an intransitive case-frame with prepositional phrases (*wait for*), while a language such as Japanese has transitive pursuit verbs taking a nominative-accusative case-frame. Based on the hierarchy, the expectation is that verbs of effective action and verbs of contact should also take a transitive case-frame in Japanese, which turns out to be true. For English and German, no such predictions can be made: the hierarchy leaves open whether verbs in categories to the left of the class of pursuit verbs could select transitive or intransitive case-frames, or both. As it turns out, verbs of effective action are associated with a transitive case-frame in these languages, while verbs of contact may select both transitive and intransitive frames.

Malchukov (2005) goes on to show that the hierarchy in Figure 3.4 does not sufficiently capture all the cross-linguistic data and subsequently introduces a semantic map that is both an adaptation and extension of it.¹³ The new map (Figure 3.5) integrates a third dimension of transitivity, namely one reflecting decreasing referential distinctness (following Kemmer 1993). The categories ‘Reflexive’, ‘Middle’, and ‘Spontaneous’ on this dimension include syntactic reflexives, inherent (i.e. semantic) reflexives and inherent reciprocals, and verbs of spontaneous

¹³It should be noted that Malchukov has not systematically tested the predictive power of the map.

action, respectively (see Table 3.3 for examples). Another addition to the map is the class of interaction verbs, which is sandwiched in between the upper and middle strands. Furthermore, the lower strand has been expanded by two categories to make finer-grained semantic distinctions. Finally, the newly introduced category 'Intransitive' at the far right of the map is not discussed in detail by Malchukov but seems to serve as a repository for stative, nonagentive intransitive verbs that cannot be categorized elsewhere. As such, this category is – somewhat oddly – defined in grammatical rather than semantic terms.

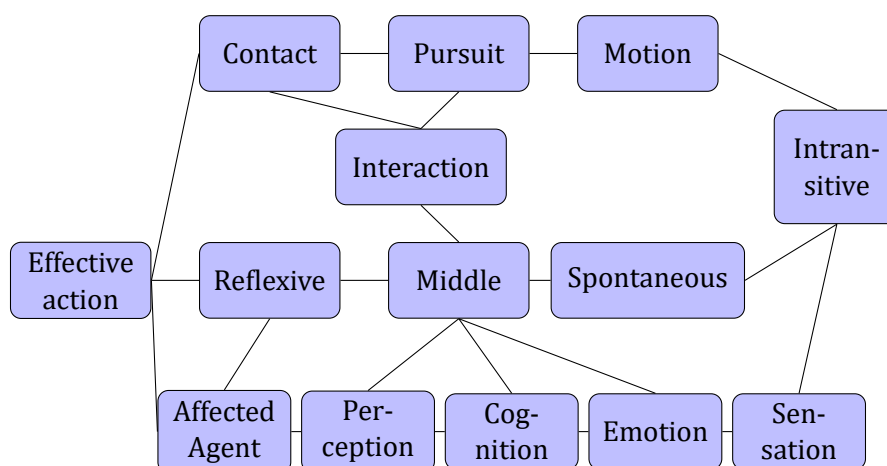


Figure 3.5: Semantic map for transitivity splits (Malchukov, 2005).

Similar to the hierarchy in Figure 3.4, the connecting lines between categories indicate (semantic) closeness of the classes and represent hypotheses about the scope of transitivity frames as well as pathways of grammatical change. In contrast to the hierarchy, the semantic map in Figure 3.5 is not implicational; it is a network. This means that if, for instance, verbs of perception in a particular language receive a transitive case-frame, the map does not imply that verbs in each of the categories toward the left of this class must necessarily receive that same case-frame. It merely predicts that functions should cover contiguous, uninterrupted areas on the map, such that if that same language also has emotion verbs taking that same case-frame, at least some verbs of cognition should allow for that case-frame, too.

In Table 3.3, I list some examples of verbs that Malchukov (2005) mentions for each of the semantic classes included in Figure 3.5. Conveniently, most of the

verbs are also part of the ValPaL-list.

Table 3.3: Examples of verbs for each of the semantic classes on the semantic map for transitivity splits (Malchukov, 2005).

Verb examples	
Effective action	<i>kill, break</i>
Contact	<i>hit, touch</i>
Pursuit	<i>search, wait for</i>
Motion	<i>go, leave</i>
Interaction	<i>follow, help</i>
Reflexive	<i>enjoy (self)</i>
Middle	<i>wash, meet</i>
Spontaneous	<i>burst, be born</i>
Affected Agent	<i>eat, take</i>
Perception	<i>see, look</i>
Cognition	<i>know</i>
Emotion	<i>fear, like</i>
Sensation	<i>be cold, freeze</i>

3.5 DGS verbs on the semantic map

In order to investigate the applicability of Malchukov's (2005) semantic map to the DGS data, I sorted all of the DGS verb forms listed in Table A.1 (Appendix A) into one of the semantic classes on Malchukov's (2005) semantic map for transitivity splits. The procedure is described in Section 3.5.1. I then discuss the semantic profiles of each of the different verb types in turn (Section 3.5.2 to 3.5.5) before highlighting a number of interesting cases of verbs with hybrid properties (Sections 3.5.6). Section 3.5.7 summarizes the main patterns and findings.

3.5.1 Procedure

Each lexical form in the DGS data had to be sorted into the most appropriate semantic category on the map. This was a straightforward task for some meanings, but proved to be more challenging for others. Although Malchukov (2005) provides some examples of verb meanings for each of the categories (see Table 3.3), he does not present an extensive list, nor does he clearly and unambiguously define all of the semantic categories on his map. For instance, verbs in the 'affected

Agent' category are described as "transitive verbs involving an affected subject" (Malchukov, 2005, p. 111), which is hardly more revealing than the category label itself.¹⁴ He then mentions 'eat', 'put on', and 'take' as examples without providing any further explanation for these classifications.

It was therefore necessary to consult additional sources.¹⁵ Tsunoda (1981) was consulted because Malchukov's map is an adaptation and extension of Tsunoda's transitivity hierarchy, and Levin (1993) was additionally consulted because Malchukov mentions her classification of English verbs as a source for his semantic classification. Here are several examples of how lexical forms were classified:

- BREAK is categorized as a verb of effective action based on Malchukov (2005).
- SMELL1 and SMELL2 are categorized as perception verbs based on Tsunoda (1981); Malchukov does not mention the verb 'smell'.
- BRING is categorized as an affected Agent verb because Levin (1993) groups 'bring' and 'take' together into a two-member class, and Malchukov categorizes 'take' as an affected Agent verb.

Some verb forms were put in intermediate positions between two categories. Here are two examples:

- Malchukov (2005) remarks that 'see' refers to an event in which the object of seeing is attained, making the argument more patient-like and thus more likely to receive a transitive frame than 'look (at)', where attainment is not an inevitable result of the event of looking. The lexical form SEE as well as the forms HEAR1 and HEAR2 are therefore placed in an intermediate position between the 'Affected Agent' and 'Perception' categories, while LOOK-AT1 and LOOK-AT2 are categorized as regular verbs of perception.
- According to Levin (1993), 'hug' belongs to the same verb category as 'marry', which Malchukov positions between the 'Interaction' and 'Middle' cate-

¹⁴Somewhat puzzlingly, Malchukov's definition of the 'affected Agent' category also includes the word 'transitive', while the map, in principle, predicts that there may be languages that do not mark verbs of this category as transitive, i.e. languages where the verb split falls between verbs of effective action and affected Agent verbs.

¹⁵I deliberately avoided making my own judgments about semantic-class membership to escape the risk of circularity, i.e. sorting a verb into a semantic category because its agreement properties express certain properties of the event and its participants that render a certain semantic interpretation more likely.

gories. HUG1 and HUG2 are therefore placed between these two categories on the map.

The full map is displayed in Figure 3.6. The different shades of blue of the verb form labels indicate verb type. Body-anchored verbs are represented in the lightest blue, followed by neutral verbs, agreeing verbs, and classifier predicates in increasingly darker blue tones. Classifier predicates can additionally be recognized by their prefix CL. Spatial verbs, which were annotated as a subset of agreeing verbs in the corpus, are distinguished from regular agreeing verbs by means of an underscore under the gloss. Verbs that are members of two semantically closely related categories are placed on or near their connecting lines.

The categorization in the map deviates from Malchukov's (2005) map (Figure 3.5) in two ways. Firstly, 'Weather verbs' are added as a separate category connected to the class of 'Intransitives', which I use to include verbs that are classified by Levin (1993) as verbs of existence.¹⁶ Secondly, the categories 'Reflexive' and 'Middle' are grouped together in Figure 3.6 because a distinction between members of the two categories can only be made on syntactic grounds, while the aim here is to categorize all of the lexical forms on the basis of the semantics of the corresponding verb meanings.

In the following sections, the results are discussed per verb type.

3.5.2 Body-anchored verbs

Figure 3.7 puts all of the body-anchored verb forms in the DGS data set on the semantic map. All semantic categories that include at least one body-anchored form are in boldface; the connecting lines between these categories have been made thicker to visualize the connections between categories.

There are no interruptions in Figure 3.7: no categories without body-anchored verbs intervene between categories with body-anchored verbs, although it should be noted that almost every semantic category on the map contains at least

¹⁶As such, I avoid the circularity that Malchukov introduces by including a grammatical category that the map is actually meant to investigate. Also note that this issue is more or less irrelevant for the purposes of this study: I am not investigating (in)transitivity, but sign language verb types. While I claim in Section 3.1 that there is a connection between transitivity marking and verb types, I have argued that this situation merely results from common underlying semantic factors, which have the additional potential to be iconically realized in a sign language verb form.

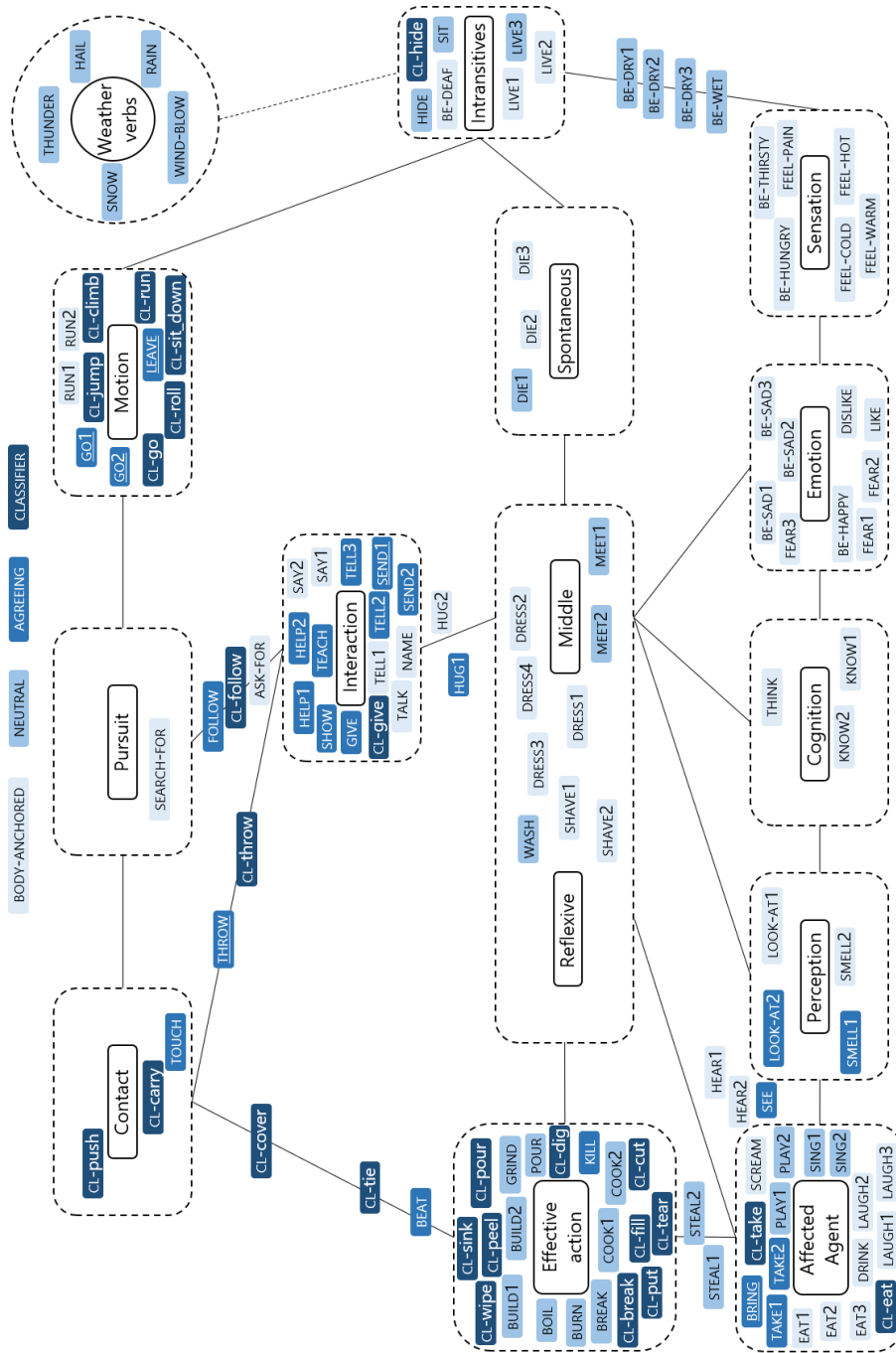


Figure 3.6: Malchukov's (2005) semantic map with the verb forms from the DGS corpus data.

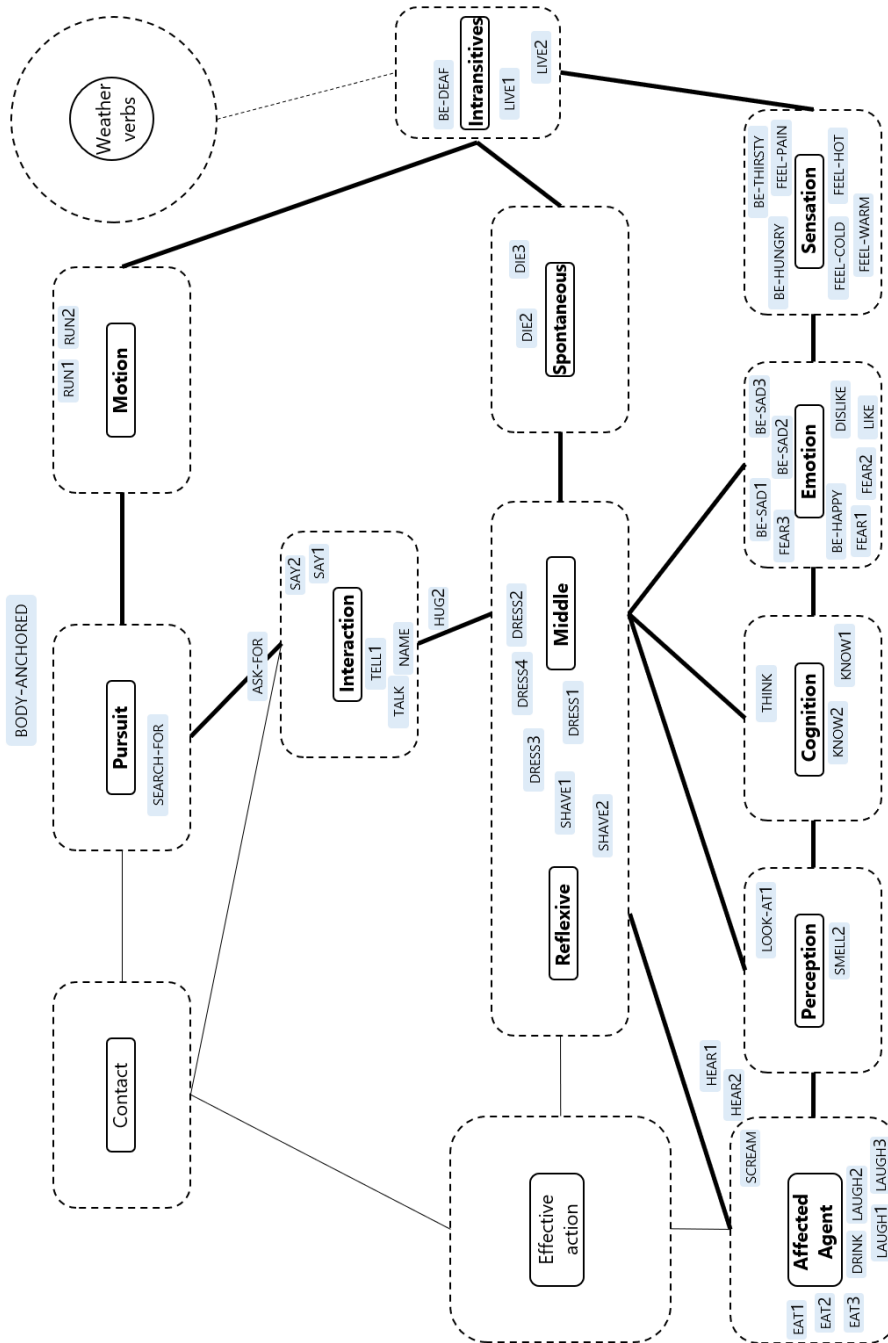


Figure 3.7: Body-anchored verb forms on the semantic map.

one verb of this type.¹⁷ Still, the largest concentration of body-anchored verbs can clearly be found in the categories at the bottom strand of the map, which orders semantic classes according to decreased agentivity of A (for Agent, following Dixon, 1979) in combination with decreased affectedness of O (for Object, following Dixon, 1979). More concretely, A becomes more like an experiencer, while O becomes more like a stimulus or causer as one moves further along this dimension. The observed pattern is hardly surprising: body-anchoring commonly serves to make iconic reference to a referent's internal experience or the expression thereof (Meir et al., 2007; Oomen, 2017), as in the verb forms KNOW1 (Figure 3.8a) and LIKE (Figure 3.8b), thus emphasizing the less agentive properties and more experiencer-like of the A argument.^{18,19}

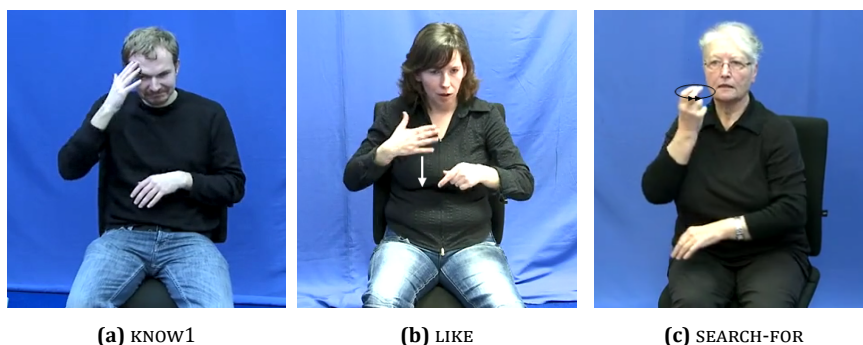


Figure 3.8: Three body-anchored verbs from different semantic categories.

Body-anchored verb forms are also fairly common in the 'Reflexive/Middle' and 'Interaction' categories. Again, the reasons are obvious. Lexical reflexives de-

¹⁷Note that even if such interruptions were attested, this state-of-affairs would not necessarily need to be interpreted as evidence against the hypothesis that verbs of particular verb types belong to semantically related classes. It could simply be the case that lexical forms of the intervening categories are not represented in the ValPaL list. Still, the ValPaL list is meant to present a representative set of verbs showing distinctive syntactic behavior such that investigating each of the verbs on the list should yield a fairly comprehensive picture of the possible constructions in a language. The analysis in this chapter rests on the assumption that, if a semantic category includes verbs of a particular type, it is likely that at least one such verb is included in the ValPaL list. Of course, if there are obvious gaps on the map for any of the verb types, further research is necessary to determine whether they indeed reflect actual gaps in the semantic profile of verbs of that particular type.

¹⁸The stimulus or causer of a psychological state, on the other hand, appears to be backgrounded in such sign language verb forms.

¹⁹The pointing sign in Figure 3.8b, signed by the non-dominant hand, refers to the sentential object.

note actions one performs on oneself and therefore typically involve the body, while the class of interaction verbs includes several verbs of speech or saying, with the corresponding lexical forms all making reference to the mouth.

Body-anchored verbs are also included, albeit more sparsely, in the categories ‘Pursuit’, ‘Motion’, ‘Spontaneous’, and ‘Intransitives’. To give an example, *SEARCH-FOR* in the ‘Pursuit’ category, depicted in Figure 3.8c, is classified as body-anchored because its place of articulation near the face is iconically motivated: it refers to a referent performing a search using their eyes. The iconic properties of this verb form, like those of other body-anchored verbs, emphasize the action performed by the Agent while minimizing the role of the object being searched. *RUN1* (Figure 3.9a) and *RUN2* (Figure 3.9b), both motion verbs, refer to the way people move their arms when running. No reference is made to the trajectory of a run, which *can* be expressed with classifier predicates (see Section 3.5.5). The two body-anchored verb forms for the verb meaning *DIE* both refer to the slitting of a throat, and as such have probable gestural roots. The forms *BE-DEAF*, *LIVE1* and *LIVE2* are in the ‘Intransitives’ class because they can be characterized as verbs of existence. The two verb forms denoting *LIVE* do not seem to be iconically motivated, while the form for the nominal predicate *BE-DEAF* iconically refers to the ear and mouth.



Figure 3.9: Two body-anchored signs denoting the verb meaning *RUN*.


In sum, body-anchored verb forms most prominently cluster around the semantic categories on the lower dimension of the map, which include verbs that denote psychological states involving an experiencer. Still, there are a number of body-anchored verbs in categories on the upper two dimensions of the map. A more detailed description of body-anchored verb forms and their (non-)iconic

properties is presented in Chapter 4.2.


3.5.3 Neutral verbs

Figure 3.10 presents the semantic map with neutral verb forms. There is a clearly discernible cluster of verb forms on the left side of the map: approximately half of all neutral verb forms are located in or between the ‘Effective action’ and ‘Affected Agent’ categories. At the opposite pole, we also find a fair number of verb forms in and around the category of intransitives. Connecting these two ends – and ensuring that all the categories with neutral verbs are connected – are a handful of forms in the ‘Reflexive/Middle’ and ‘Spontaneous’ categories. Admittedly, given the paucity of verb forms in these categories, it might be somewhat premature to conclude that neutral verbs are indeed organized along the middle dimension. In this context, I should also note that the five occurrences of WASH in the corpus data are instances of non-reflexive uses of the verb, as illustrated in example (4).²⁰ Reflexive uses of the verb, which may be expected to be body-anchored, were not attested in the corpus data.

- (4) INDEX_a CAREFREE $\overline{\text{WASH CAREFREE}}$ ^{rs}
 ‘She was cluelessly washing [the dishes].’ [fra01b-A-00:36.00]

The two verb forms denoting MEET (Figure 3.11a and 3.11b) reference reciprocity through the converging movement of the hands, which each represent an individual. DIE1 is articulated right in front of the signer with a -hand in vertical position, finger tips oriented away from the signer. A 90° orientation change results in an end position in which the hand faces downward.

The semantic profile of neutral verbs is radically different from that of body-anchored verbs: there are hardly any neutral forms in the categories on the lower dimension, while there are no body-anchored verbs that belong to the most prototypical semantic category for neutral verbs, namely that of ‘Effective action’. As such, the maps provide a semantic argument for distinguishing between verbs of the two types. More (morphosyntactic) arguments in support of such a distinction are offered in Chapters 4 and 5.

²⁰The form WASH, which involves a reverse rotating movement of two -hands making contact, appears to be used by some signers under the meaning ‘dishwash’, as in (4), and by others under the more general meaning ‘wash’.

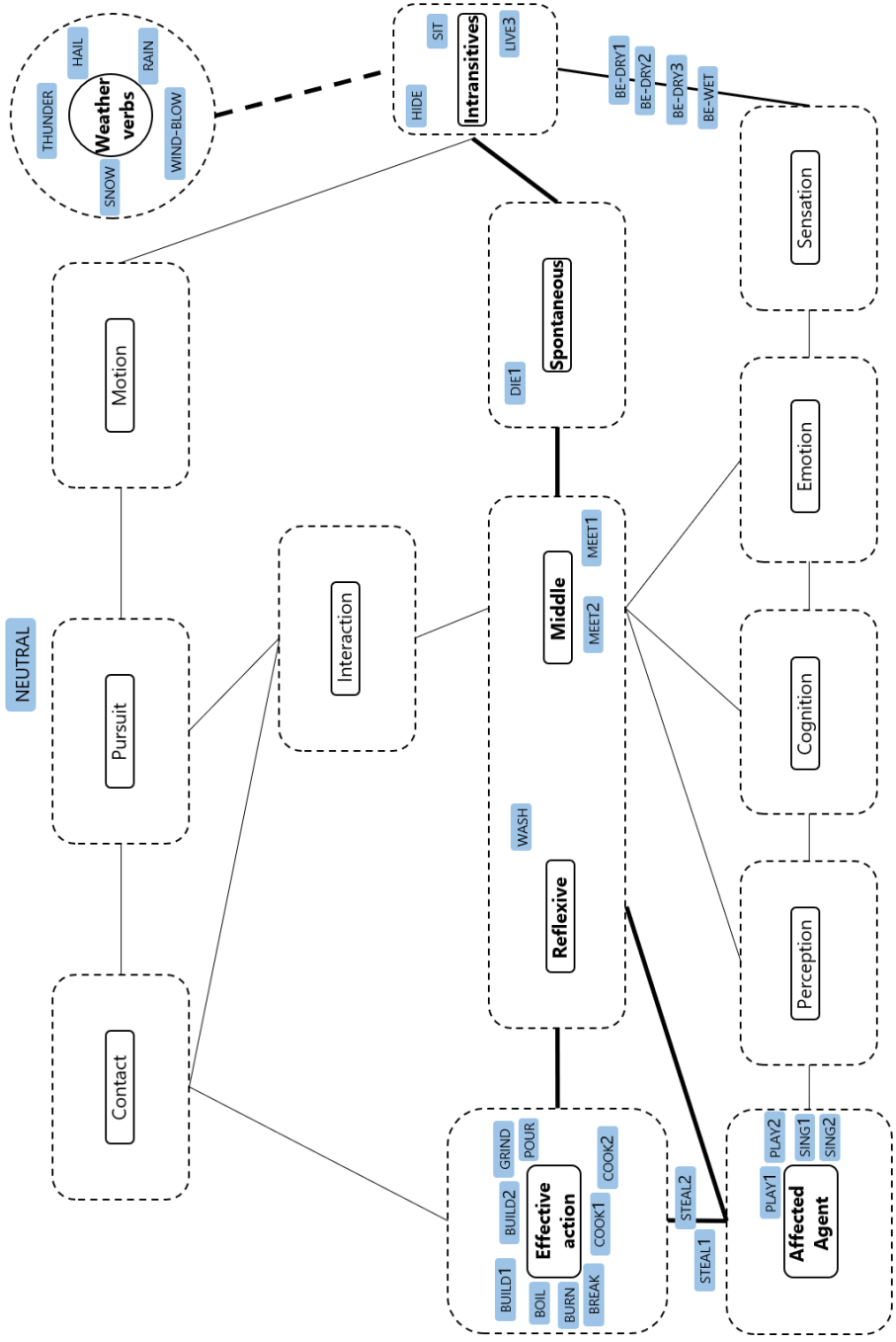


Figure 3.10: Neutral verb forms on the semantic map.



Figure 3.11: Two neutral verb forms denoting the reciprocal event MEET.

3.5.4 Agreeing verbs

Figure 3.12 positions the agreeing verb forms in the data set on the semantic map. Spatial verbs, which are treated as a subtype of agreeing verbs and are classified on the basis of their semantics, are displayed in a lighter shade of blue and marked by means of an underscore under the gloss.²¹ For the sake of illustration, Figure 3.13 displays three agreeing verbs: BEAT (Figure 3.13a) and TEACH (Figure 3.13b) are of the agreeing kind, while LEAVE (Figure 3.13c) is of the spatial kind.²²

Agreeing verbs cluster together in categories toward the left side of the map (i.e. highly transitive verbs), and the upper dimension of the map, which orders categories according to decreased affectedness of the O argument. The ‘Motion’ category – unsurprisingly – contains only agreeing verbs of the spatial kind. Regular agreeing verbs are most frequent in the ‘Interaction’ category – which is again hardly unexpected given that interaction events typically involve two (animate) participants, which agreeing verbs are perfectly equipped to denote. Finally, there are a handful of forms in various categories toward the left of the map.

It should be noted that the categories ‘Pursuit’, ‘Contact’ and ‘Effective action’, which connect the upper strand of the map with the lower strand, only include or share with other categories a handful of lexical forms. It is possible, of course, that this state-of-affairs is merely symptomatic of the limited set of verb meanings

²¹In Chapter 6, I investigate in more detail whether there are any morphosyntactic differences between agreement and spatial verbs in DGS that would justify classifying them as different types.

²²The subscripts in the figure captions indicate agreement marking, where letters (‘a’, ‘b’) represent loci in the signing space. The subscript ‘1’ indicates agreement with the signer, i.e. first person.

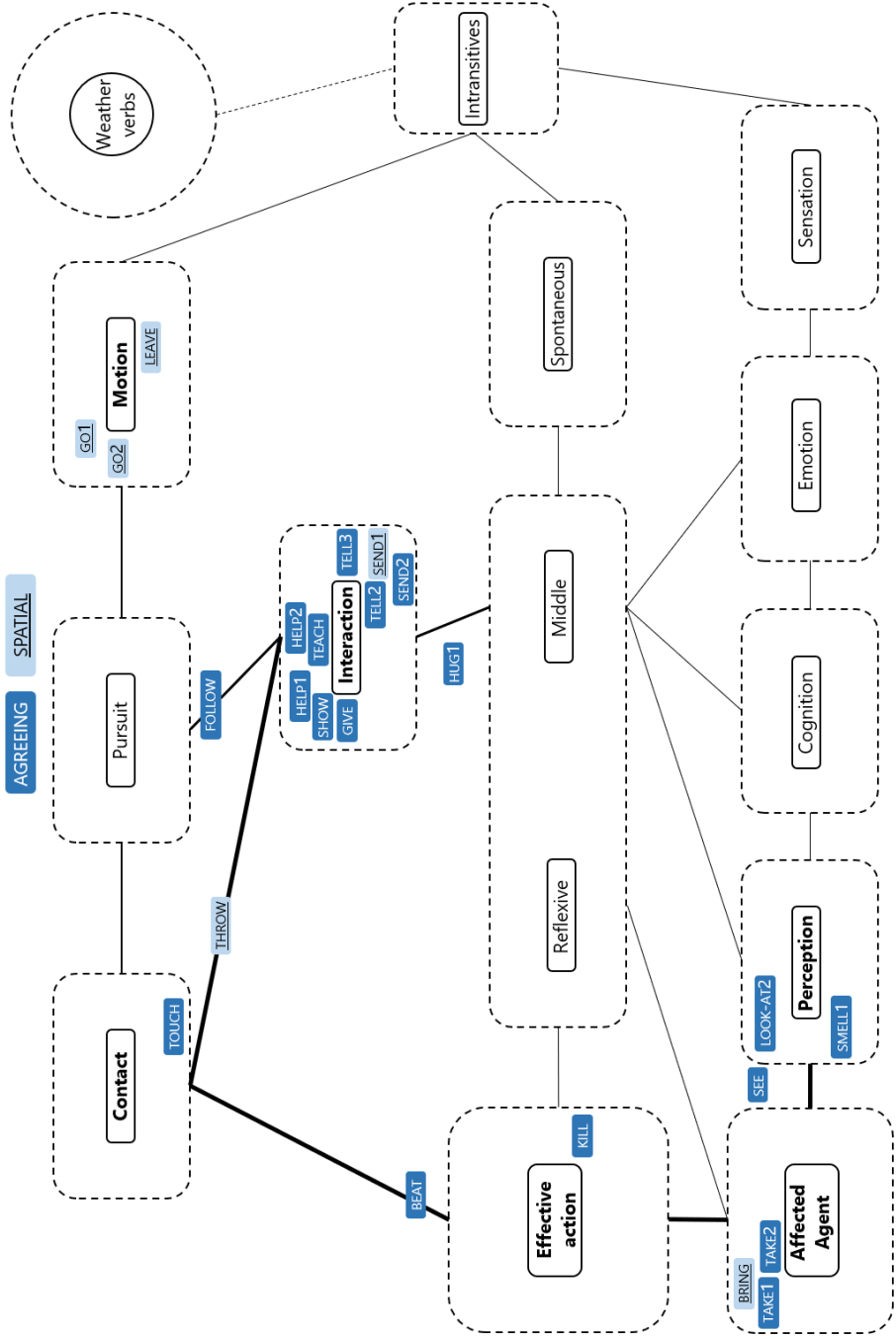


Figure 3.12: Agreeing verb forms on the semantic map.

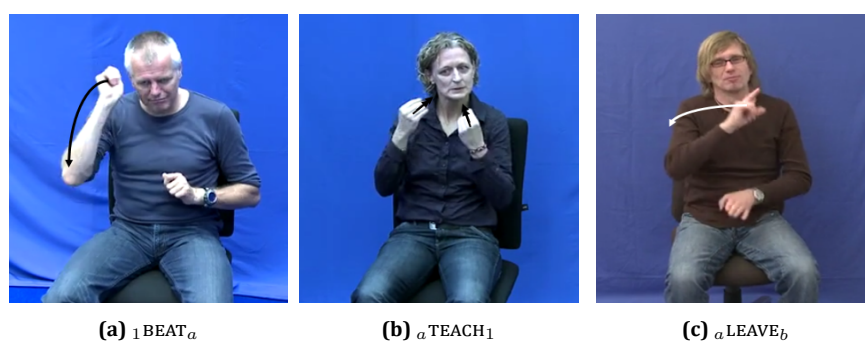


Figure 3.13: Three agreeing verbs from different semantic categories.

that the ValPaL list includes – only one lexical verb has been classified as a verb of contact, for instance – but no definitive conclusions can be drawn on the basis of this data set.

Given that both transitive verbs in spoken languages and agreeing verbs in sign languages (Meir, 1998, 2002) have been characterized as verbs of transfer, one might hypothesize that agreeing verbs cluster around the category of ‘Effective action’, the most transitive category on the map. However, the map in Figure 3.12 does not provide convincing evidence in support of this hypothesis. Agreeing verbs are represented only in low numbers in the left-most categories on the map, and concentrate more densely in other areas. Rather, as demonstrated in Section 3.5.3, it appears that neutral verbs represent the most prototypically transitive concepts. A more accurate general semantic characterization of agreeing verbs would be to say that they express some form of interaction between participants, where the degree of involvement of the O argument may differ; compare the verb meanings TEACH and LOOK-AT, for instance.

3.5.5 Classifier predicates

For the sake of completeness, I briefly discuss the semantics of classifier predicates here. Figure 3.14 shows that the semantic profile of classifier predicates is similar to that of agreeing verbs: classifier predicates have a clear preference for categories on the upper dimension and toward the left side of the map, although there are more classifier predicates than agreeing verbs in the ‘Contact’ and ‘Effective action’ categories.

Overall, classifier predicates do not violate the constraints posed by the se-

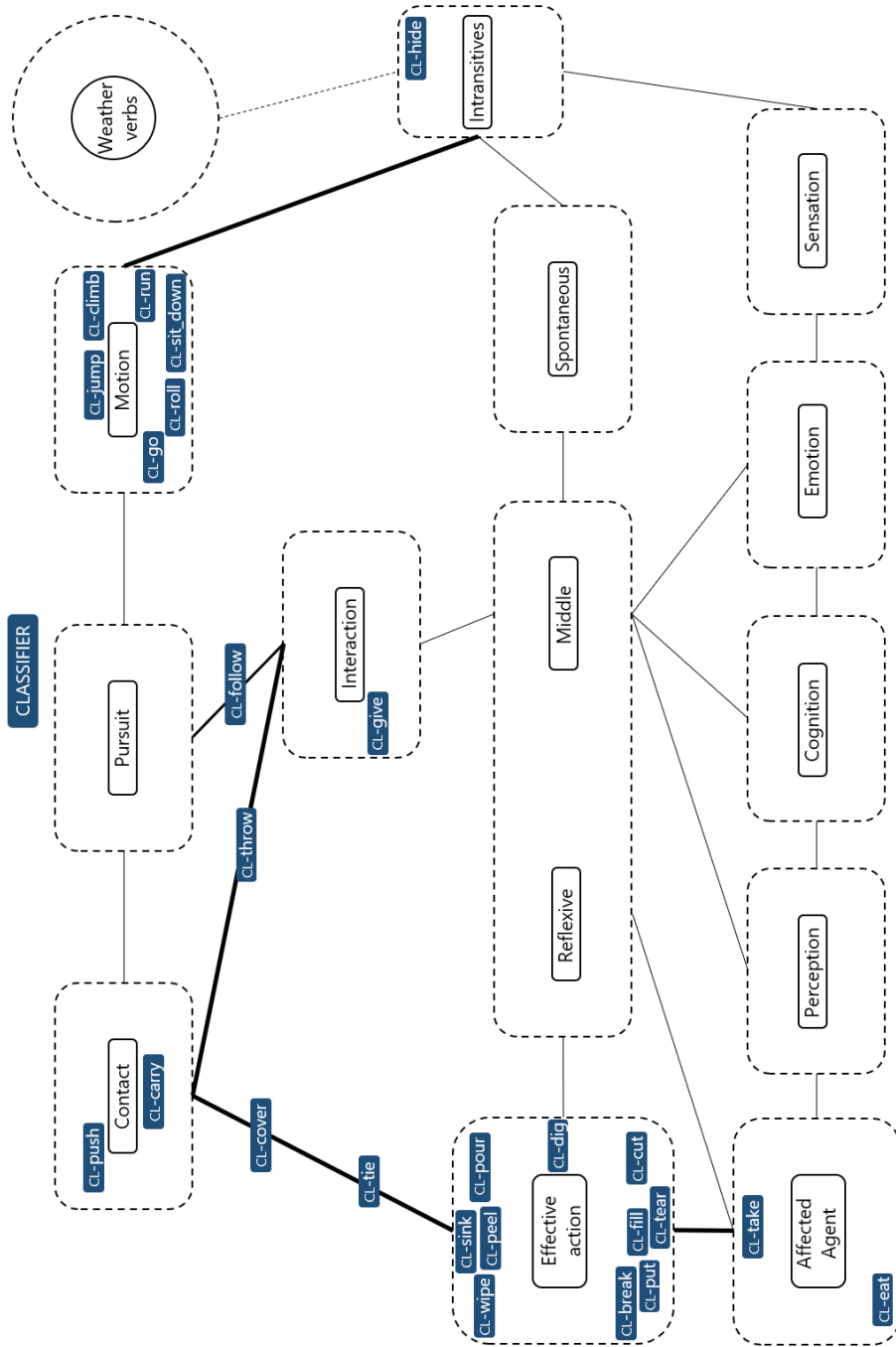


Figure 3.14: Classifier predicates on the semantic map.

mantic map, with the exception that there are no classifier predicates in the ‘Pursuit’ category – but this deviation may well turn out to reflect methodological shortcomings.

3.5.6 Hybrid verbs

The results discussed in the sections above indicate that Malchukov’s (2005) semantic map for transitivity splits is suitable for characterizing and making predictions about the semantics of verb types in DGS: according to expectation, verb forms of each of the types discussed cover contiguous areas of the map. In this section, I examine verb forms attested in the data with ‘hybrid’ properties, i.e. forms that possess characteristics of more than one verb type. I expect such forms to occur in areas of overlap between the domains of the verb types that they possess properties of.

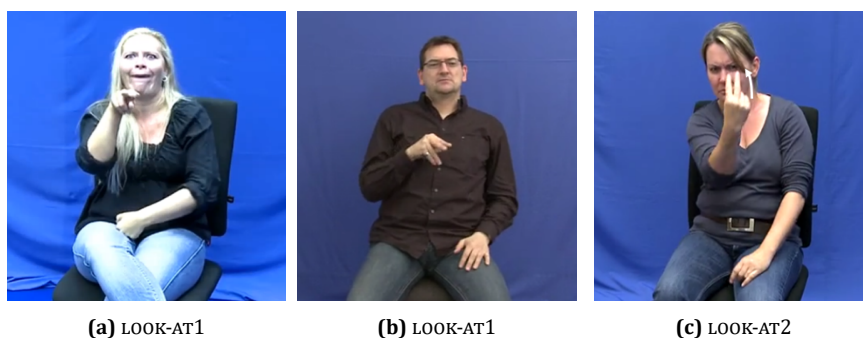



Figure 3.15: Two instances of the hybrid LOOK-AT1 and one instance of the regular agreeing verb LOOK-AT2.


Firstly, consider the verb form LOOK-AT1 (Figure 3.15a-b). This verb is articulated with a -handshape; palm facing down and fingertips oriented away from the signer. The hand is usually, but not always (cf. Figure 3.15b), positioned in front of the signer’s eyes. LOOK-AT1 does not involve movement, and the verb is body-anchored in the sense that it is always articulated close to the body. The index and middle fingers – which iconically reference a pair of eyes – face away from the signer; this orientation cannot be reversed. Still, it appears that LOOK-AT1 has the ability to orient the two fingers toward a specific location in the signing space. As such, LOOK-AT1 can be analyzed as a hybrid verb form with properties of both body-anchored and agreeing verbs. LOOK-AT2, on the other hand, has an identi-

cal handshape but also involves an arc movement, which can be freely modified to show directionality (Figure 3.15c). This verb is therefore analyzed as a regular agreeing form.

There is some indication that LOOK-AT1 serves a grammatical function or is in the process of acquiring one. Much like the corresponding verb in American Sign Language (ASL) – which has been analyzed as a light verb by Winston (2013) – LOOK-AT1 in DGS seems to have acquired the function of introducing a role shift; see (5) for an example. Role shift is a grammatical means of triggering a context shift that sees the signer conveying the thoughts, words or actions of another referent (Herrmann & Steinbach, 2012; Lillo-Martin, 2012). Indeed, the verb itself is also consistently marked by non-manual role-shift markers (see Herrmann and Steinbach (2012) for a description of such markers in DGS; also see Chapter 1.2.1).

At this stage, it is not entirely clear whether tokens where the fingertips point toward a locus associated with a referent, as in Figure 3.15b, genuinely express object agreement. Although the orientation of the fingers may be modified as if for that purpose, there are no examples in the corpus data in which an object occurs within the same clause. Rather, it appears as if LOOK-AT1 has gained a broader, less literal, meaning: it introduces a referent's affective response toward a situation previously expressed in the discourse. Since it is unclear whether or not LOOK-AT1 agrees with objects, I classified the verb as body-anchored rather than agreeing.

- (5) INDEX₁ $\overline{\text{LOOK-AT1}}^{\text{rs}} / \overline{\text{ALSO NOT BAD PU}}^{\text{rs, hs}}$
 'I thought: "That's also not bad."' [koe03-A-09:13.70]

Interestingly, the verb SEE, which is semantically very closely related to LOOK-AT1, is also a hybrid. It is articulated with a -handshape, palm oriented toward the signer's face, and involves a path movement directed away from the signer. While the verb's trajectory can be modified to agree with the object, the corpus data suggest that the locus at which the movement starts is fixed: it is always in front of the signer's face. Because the data include clear examples of SEE agreeing with an object, I classified the verb as an agreeing verb instead of a body-anchored verb. Yet, it should be evident that both SEE and LOOK-AT1 do not perfectly fit into either category.

HUG1 also displays properties of body-anchored verbs and agreeing verbs; Figure 3.16a presents an example. Unlike SEE, HUG1 is a backward agreeing verb and thus shows the reverse agreement pattern: in modified form, the verb starts out at the locus of the object and ends at a fixed location in front of the signer's

chest. HUG2, another lexical form attested in the corpus that denotes the same verb meaning, is a standard body-anchored verb form (Figure 3.16b).²³

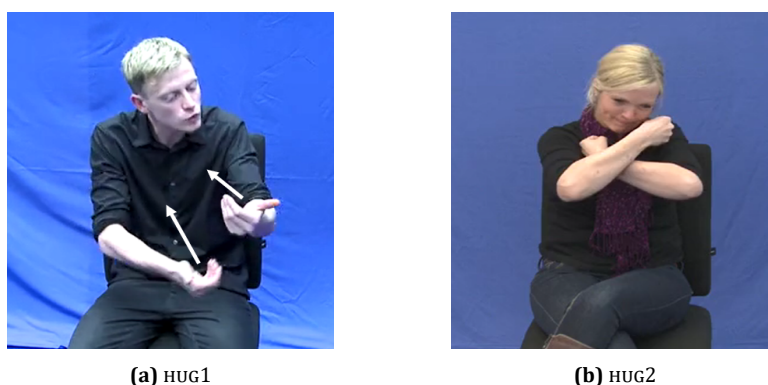


Figure 3.16: Two lexical forms denoting HUG; HUG1 (a) is a hybrid, while HUG2 (b) is a regular body-anchored verb.

In addition to the three forms discussed above, there is one very clear instance of SAY1 – an otherwise regular body-anchored verb – displaying object agreement in the data. Figure 3.17 illustrates the example. Note that the locus for the object ('hearing people'), toward the signer's left, has been established earlier in the discourse.

As it happens, SAY1 is positioned in the 'Interaction' class on the semantic map, which includes a mix of both body-anchored and agreeing verbs. Likewise, HUG1 is situated between the 'Interaction' and 'Reflexive/Middle' categories – precisely at the junction of the areas occupied by agreeing verbs and body-anchored verbs. Moreover, SEE, LOOK-AT1, and LOOK-AT2 are found in another corner of the map in which the domain for agreeing verbs ends and that of body-anchored verbs begins. These are precisely the places where such hybrids would be expected to occur if one hypothesizes that they represent intermediate stages in diachronic development; see Section 3.6 for further discussion.

The hybrid forms discussed above all combine properties of body-anchored and agreeing verbs.²⁴ A different kind of hybrid is exemplified by the verb forms MEET1 (illustrated earlier in Figure 3.11a) and MEET2. As far as can be observed,

²³Macht (2016) lists another three examples of body-anchored/agreeing verb hybrids in DGS, namely HATE, VOMIT, and TRUST.

²⁴Meir et al. (2007) also refer to forms of this type as hybrids, arguing that the subject is marked by the body while the person of the object is marked by directionality.



Figure 3.17: A token of SAY1 in the corpus data displaying object agreement.

these forms behave similarly; I focus on MEET1 here because only a handful of clauses with MEET2 are included in the data set.

In some cases, MEET1 involves a short simultaneous movement of both hands on the mid-sagittal plane, with the hands converging to make contact approximately in the center of neutral space.²⁵ However, in other cases, the starting loci of the two hands are clearly different, suggesting that there may, in fact, be agreement with the two (symmetrical) arguments. To give an example: in the left panel of Figure 3.18, the verb appears to agree with a first-person referent (the dominant right hand is positioned relatively close to the body) and a third-person referent which had been localized previously at approximately the location where the signer's left hand begins the movement.



Figure 3.18: MEET1 with apparent agreement properties.

²⁵For articulatory reasons, the movement is often slightly skewed away from the mid-sagittal plane.

One could object that the verb in Figure 3.18 is actually a classifier predicate, since the form involves two classifier handshapes representing upright animate entities. However, there are good arguments against such an analysis. In this particular token, the third-person referent is actually a plural ('parents') while the left hand makes reference to only one entity. Furthermore, the orientation of the hands does not reflect the way individuals who meet are typically positioned relative to one another, and there is a clearly observable moment of contact between the hands whereas it is unlikely that the event denoted by the verb involves contact. Similar observations, which speak in favor of a lexical analysis, apply to the other instances of MEET1 and MEET2 in the data. As such, these forms qualify as 'lexical reciprocals', defined by Börstell, Hörberg, and Östling (2016) as signs – be they nouns, verbs, or adjectives – in which “each of the two hands [...] iconically represent one of the two sides of the reciprocal situation” (Börstell, Hörberg, & Östling, 2016, p. 399).

I thus conclude that MEET1 and MEET2 are forms combining properties of neutral and agreeing verbs. Indeed, these forms are positioned on the semantic map at the junction of the domains of neutral verbs and agreeing verbs. Other symmetrical verbs, such as KISS, are likely candidates for displaying similar hybrid properties in DGS, although future research should find that out.

3.5.7 Summary

To summarize, the sections above have demonstrated that each verb type occupies a distinctive and generally contiguous area on Malchukov's semantic map. Body-anchored verbs occur predominantly in categories ordered according to a combination of decreased agentivity of A and decreased affectedness of O. Neutral verbs tend to denote prototypically transitive or prototypically intransitive meanings. The corresponding semantic categories are positioned at opposite ends of the map; a handful of neutral verb forms in the 'Reflexive/Middle' and 'Spontaneous' categories connect the two poles. Agreeing verbs (as well as classifier predicates) are clustered around the upper left part of the map, comprised of categories of verbs that select subjects with a relatively high degree of agentivity. Hybrid forms are found in areas with overlap between verb types.

Overall, the results lend credibility to the hypothesis that case-marking systems in spoken languages and the verb type system in sign languages are sensitive to the same underlying semantic factors, pointing toward the centrality of these

notions in language. This outcome opens up many opportunities for future research. An obvious question, for instance, is whether diachronic change indeed occurs along the pathways indicated in the map. Although diachronic data in sign languages is scarce, Section 3.6 discusses some available sources.

Clearly, data from other sign languages are needed to test the validity of the map and to determine if more or fewer semantic distinctions are necessary to account for all possible patterns in sign languages. However, one should bear in mind that the more radical the changes that need to be made, the weaker the claim that verb type and case-marking are governed by common semantic properties.

In the next section, I expound on the issues outlined above by reflecting on what the results may tell us about the verb type system in DGS, and in sign languages in general.

3.6 Discussion

Let us briefly take stock of past and current approaches to verb-type classification in sign languages (also see Chapter 1.2.3). In her classic work on sign language verbs, Padden (1988) argues for a tripartite classification of lexical verbs in sign languages. She distinguishes between the categories of agreement verbs (originally referred to as inflecting verbs), spatial verbs, and plain verbs.²⁶ These verb types differ in their agreement properties, and it is commonly assumed that verb semantics determines class membership to some extent. Meir (1998, 2002), for instance, claims that predicates that denote transfer, such as GIVE, are likely to be of the agreement type (6a). Verbs denoting movement toward and/or from a location, on the other hand, are argued to express concepts of motion, as in (6b), which includes two spatial predicates. Finally, plain verbs, such as KNOW1 in (6c),

²⁶Of course, as previously discussed in Chapter 1.2.3, adaptations of this classification have also been put forward over the years. Furthermore, a glance at the literature immediately reveals that multiple terms have been used in reference to the different verb types. This particularly holds for agreement verbs, which have been variously referred to as ‘movement verbs’ (e.g. Supalla, 1990), ‘directional verbs’ (e.g. Fischer and Gough, 1978; Lillo-Martin and Meier, 2011), and, gaining more traction in recent years, ‘indicating verbs’ (e.g. Liddell, 2000; Cormier, Fenlon, and Schembri, 2015). The terms often allude to particular views on the linguistic status of agreement (see Chapter 6.1 for further discussion). Despite all of these developments, the terminology used by Padden (1988) is still the most widely used and accepted. Recall that one of the main questions this dissertation hopes to answer is whether it holds up against the knowledge acquired over the past three decades – up to and including the current work.

which unlike agreeing and spatial verbs may not be modified, are described by Meir (1998, 2002) in negative terms.

- (6) a. INDEX_a INDEX₁ FOR GRANDCHILD₁ **GIVE**_b
 'I gave the rest of the money_a to my grandchildren_b.'
 [lei13-B-01:34.80]
- b. END MOVE_a **GO1**_a DEAF SCHOOL
 'Eventually, I went to a deaf school.'
 [mst16-B-00:59.00]
- c. INDEX₁ **KNOW1** GOOD
 'I know it well.'
 [hh01-A-03:19.00]

At the same time, it is known that verbs that denote the same meaning in different sign languages may differ with respect to agreement properties – and thus belong to distinct categories. The sign HATE, for instance, can agree in ISL (Meir, 1998), but it is a plain verb in Sign Language of the Netherlands (NGT; Oomen, 2017), while Macht (2016) describes the DGS variant as a hybrid between a body-anchored and an agreeing verb form. UNDERSTAND is a plain verb in many sign languages, including ASL, DGS, and NGT, but it is known to be a (backward) agreement verb in Catalan Sign Language (de Quadros and Quer, 2008).

Moreover, verbal signs may change type over time: studies on DTS (Engberg-Pedersen, 1993), ISL (Meir et al. 2007; Meir 2012, 2016), and DGS (Pfau et al., 2018) have all reported on verbs that have developed from body-anchored verbs into agreeing verbs, with some of these authors additionally making the observation that this change has occurred via an intermediate stage involving only object agreement. In DTS, this change has been described by Engberg-Pedersen (1993) for the verb TELEPHONE, while verbs such as NOTIFY, INFORM, and TEASE – now double-agreeing forms – are said to have originally displayed only object agreement. Examples reported by Meir (2012, 2016), Meir et al. (2007) for ISL include TELEPHONE, TELL, ASK, and HATE, while in DGS, TELEPHONE and TRUST are said by Pfau et al. (2018) to have undergone such a change.²⁷ Indeed, I have shown in Section 3.5.6 that some of the verbs in the DGS data possess similar such hybrid properties and as such fall in between verb classes.

All of these observations accentuate both the fluidity and the regularity of the sign language verb-type system. On the one hand, there are many verbs that do not

²⁷Pfau et al. (2018) additionally note that a similar change has occurred for the verb TELEPHONE in NGT.

convincingly fit the mold of any of the categories both within and across sign languages and in either semantic or grammatical terms, or both. On the other hand, it is clear that there are remarkable consistencies across and within sign languages with respect to verb-type membership and – as far as we can tell – pathways of change.

In light of this discussion, the value of the semantic map with the DGS verb forms (Section 3.5) becomes evident. Since no prototypicality of function is assumed, the map can offer a considerably fine-grained picture of verb type semantics, while simultaneously allowing for the plasticity the system presents. For instance, the map can unproblematically deal with verbs that are of different types cross-linguistically, such as UNDERSTAND. In a language in which the emotion verb UNDERSTAND is an agreeing verb, the map simply predicts that contiguous categories should also include agreeing verbs when they border on other categories that include such verbs too. Thus, if a language contains agreeing ‘affected Agent’ verbs in addition to agreeing verbs of cognition, then it must also have agreeing verbs of perception in order not to violate the predictions the map dictates.²⁸

In addition, the diachronic changes reported in Engberg-Pedersen (1993), Meir et al. (2007), and Pfau et al. (2018) can be reappraised from a fresh perspective with the use of the semantic map. In these cases, the map makes particular predictions about the possible pathways of change – even if it cannot tell us anything about the direction of change.²⁹ As a thought experiment to illustrate this point, imagine that all verbs in a particular sign language were body-anchored at a certain point in time, but, three generations later, a subset of verbs now display agreement properties. On the basis of the semantic map, we predict this subset to include verbs that belong to semantic categories that are connected on the map, e.g. ‘Effective action’, ‘Contact’, ‘Pursuit’, and ‘Interaction’. The development should only occur along the lines that are drawn in the map. It would go against prediction to find that, at one point, there were agreeing verbs in the ‘Effective action’ and ‘Pursuit’ classes, but not in the ‘Contact’ class, for instance.

²⁸That being said, it should be noted that both HATE and TRUST in DGS have been described as hybrids in other sources (Macht, 2016; Pfau et al., 2018), thus leading to the prediction that DGS should also have hybrid or fully agreeing verbs of cognition. Such forms were not attested in the data, although of course it is possible that they exist but are simply not represented in the ValPaL list of verb meanings.

²⁹Yet, if Meir et al. (2007) are correct in their claim that body-anchored verbs represent more basic forms than agreeing verbs – a sentiment which is echoed in Pfau et al. (2018) – then this observation forms an independent basis on which to build our predictions.

It seems implausible that a sign language ever included only body-anchored verbs; verbs articulated at the center of the signing space also seem likely to occur in a sign language from its inception, too. These are the verbs that I refer to as neutral verbs. Now, it has been argued for various sign languages that these verbs have the potential to be localized, which is a strategy that may be – and has been – analyzed as another instance of agreement (see e.g. Costello, 2015; Lourenço, 2018; Meir, 1998, 2002).³⁰ Perhaps, then, there might also be a second dimension of change where verbs articulated at the center of the signing space may develop the ability to become displaced for agreement purposes. Again, the expectation would be that such change may only occur along the pathways dictated by the semantic map. Chapter 5 studies neutral verbs in detail and may thus help determine whether the DGS data provide any support for this tentative claim.

Of course, I do not necessarily intend to claim that all verbs eventually become double-agreeing or localizing verbs. It is rather the other way around: if a language has such verbs, they will have developed (i) from verbs with a fixed place of articulation either on the body or at the center of the signing space, and (ii) along certain fixed pathways, which can be visualized in a semantic map. Further research is necessary to find out whether this hypothesis bears any fruit.

The next chapters zoom in on each of the three main verb types in turn. Chapter 4 focuses on body-anchored verbs, Chapter 5 discusses neutral verbs, and Chapter 6 investigates agreeing verbs. Each chapter will look in closer detail at individual verb forms to determine whether there are any commonalities that can be attributed to shared iconically expressed properties. I survey the type of constructions in which verbs of the different types may occur, paying particular attention to constituent order, valency patterns, agreement or localization properties, and subject-drop patterns. A cross-type comparison of these properties in Chapter 7 eventually leads to the general proposal, laid out in Chapter 8, that all verb types (except spatial verbs) are in an agreement relation with their arguments, even if this relation is not always overtly expressed on the verb. As such, this dissertation advocates a unified analysis of sign language verbs, irrespective of verb type. I hope the present chapter has provided a first demonstration of why such an analysis is worth pursuing.

³⁰I discuss this phenomenon in more detail in Chapter 5.

CHAPTER 4

Body-anchored verbs

As precluded in Chapter 3, I make a distinction between two types of verbs, which I call body-anchored and neutral verbs, that in the literature have typically been merged together under the label of ‘plain verbs’ (but see the beginning of Section 4.1). The distinction was originally motivated by differences in their phonological properties, in particular in their place of articulation on the body vs. in the signing space. The semantic map analysis presented in Chapter 3 subsequently also provided semantic support for this choice: body-anchored verbs and neutral verbs denote very different semantic concepts.

In this chapter, I investigate the formational as well as morphosyntactic properties of body-anchored verbs in further detail; neutral verbs are discussed in the next chapter.¹ The results contribute toward a proper analysis of the similarities and differences between verbs of the two types (also see Chapter 7 for a systematic comparison across verb types).

While body-anchored verbs have not often been discussed as a separate category, some works do – in more or in less explicit terms – make reference to them as such. I discuss the relevant literature in Section 4.1. Section 4.2 presents a description of the body-anchored verb forms in the corpus data. Special attention is paid to recurring iconic form-to-meaning mappings across verbs of this type. I discuss the morphosyntactic properties of body-anchored verbs in Section 4.3, focusing on constituent order, valency, and subject-drop patterns. Section 4.4 summarizes the chapter.

4.1 Background

There appears to be some disagreement in the literature regarding which sign language verbs should be defined as ‘plain’. Padden (1988, p. 24) considers all verbs that “do not inflect for person or number” to be plain and explicitly states that “not all plain verbs involve contact with the body”, thus also including verbs that are articulated in the signing space in this category. Padden (1988, 1990) notes that (some) such forms have the ability to be spatially modified for location, analyzing this kind of localization as a pronoun clitic. However, other researchers have argued that localization is actually a form of agreement with a single internal argument (Costello, 2015; van Gijn & Zwitserlood, 2006). I postpone a more detailed discussion of this phenomenon until Chapter 5, but let me just point out that these

¹The two chapters are equivalent in structure in order to facilitate comparison. Chapter 6 on agreeing verbs, too, adheres to the same general structure.

observations have perhaps led Padden, Meir, Aronoff, and Sandler (2010, p. 571) to claim that all plain verbs are, in fact, “anchored to the body”.²

In this dissertation, I start from the assumption that body-anchored verbs and neutral verbs are, indeed, different. One of the main aims of the current and the next chapter is to investigate in detail whether such a distinction is justified, such that it would make sense to abandon the concept of ‘plain verbs’ altogether. In that context, two previous studies in particular (one being my own) are important to discuss; both highlight the apparent dual function of the signer’s body in body-anchored verbs.

4.1.1 Meir et al. (2007)

Based on data from two sign languages, namely Al-Sayyid Bedouin Sign Language; (ABSL) and Israeli Sign Language (ISL), Meir et al. (2007) identify a systematic lexicalization pattern that is specific to body-anchored verbs and which they argue is the result of iconic form-to-meaning mappings. Specifically, the authors propose that the signer’s body corresponds to the subject in body-anchored verbs, while – as with verbs of any type – the hands may represent various other facets of the event denoted by the verb.³ Consider the iconic sign EAT, for instance, which happens to be identical in form in both ISL (discussed in Meir et al., 2007)) and German Sign Language (DGS; Figure 4.1).

Meir et al. (2007) decompose this sign into four formational elements which they claim iconically map onto components of the verb’s semantics. Based on Taub’s (2000, 2001) method for representing iconic mappings (see Chapter 1.2.7), the authors schematize these form-to-meaning mappings in a table, reproduced here as Table 4.1.

Three of the meaning components in Table 4.1 represent properties of the event and are expressed by the hands, while one (‘mouth of eater; agent’) is a property of the agent and is expressed by the body. Following the general mapping principle that the argument with the highest-ranking thematic role maps onto


²It is not entirely clear how Padden et al. (2010) classify verbs articulated in the signing space. Apart from plain verbs, which they claim to be exclusively body-anchored, the authors only distinguish agreement verbs, which “mark for person and number of the subject and object”, and spatial verbs, which do not. Members of both these classes are described as “verbs that exploit space” (Padden et al., 2010, p. 571).

³In Section 4.2, I present a close examination of the event properties that the hands may iconically represent in body-anchored verb forms.



Figure 4.1: A token of EAT1.

Table 4.1: Iconic form-to-meaning mapping of EAT in ISL, reproduced from Meir, Padden, Aronoff, and Sandler (2007).

Form	Meaning
 -handshape	Holding an object (food)
Mouth of signer	Mouth of eater, agent
Inward movement	Putting an object into mouth
Double movement	A process

subject (e.g. Fillmore, 1968; Grimshaw, 1990), the mapping yields what Meir et al. (2007) coin ‘body as subject’. The authors point out that their proposal forms a partial solution to the object-over-subject-primacy puzzle, i.e. the apparent fact that – contra to what can be observed in spoken languages – objects appear to be more frequently and consistently marked than subjects, as described for a variety of sign languages (see e.g. Bahan, 1996; Liddell, 2003; Meier, 1982; Padden, 1988 for American Sign Language (ASL), Meir et al., 2007 for ISL, Engberg-Pedersen, 1993 for Danish Sign Language (DTS), Costello, 2015 for Spanish Sign Language, and Pizzuto, 1986 for Italian Sign Language). By positing that the subject is represented by the signer’s body, this typologically unexpected conclusion no longer holds.

Meir et al. (2007) consider ‘body as subject’ to be a basic lexicalization strategy in sign languages. Evidence comes from the fact that ABSL does not have agreement verbs but does have body-anchored verbs, while ISL developed a system of agreement from body-anchored verbs over the course of three generations. First-generation signers of ISL only use unmodified body-anchored verbs to express concepts of transfer; signers in their 30s and 40s modify them to agree with

their objects, and younger signers use the full double-agreement pattern. According to Meir et al., these stages thus reflect a gradual ‘detachment’ of the subject from the body (also see Meir, 2012).

As discussed in Chapter 3, Meir et al. (2007) point out that the pattern of change they describe is not unique to ISL: similar findings have been reported for DTS by Engberg-Pedersen (1993), and the pattern is expected to be present in other sign languages as well. Indeed, Pfau et al. (2018) have argued that a number of verbs in DGS have undergone a similar process of change.

4.1.2 Oomen (2017)

I have previously studied psych-verbs – a subclass of body-anchored verbs – in Sign Language of the Netherlands (NGT; Oomen, 2017). The study is relevant here because it makes a couple of predictions about the behavior of all body-anchored verbs that may potentially hold across sign languages due to iconicity. Based on naturalistic data from the Corpus NGT (Crasborn et al., 2008), I described general argument-structure patterns of psych-verb constructions, and I showed that the fact that psych-verbs are almost all body-anchored has consequences for subject-drop patterns.

The analysis was based on 181 examples with 37 verb forms denoting 16 different psych-verb meanings. Of these forms, 32 are body-anchored. I made a further distinction between verb forms in which the place of articulation makes reference to a metaphoric location of an emotion (e.g. LOVE; Figure 4.2a) or to a type of behavior associated with the expression of an emotion (e.g. SURPRISED; Figure 4.2b), on the one hand, and verb forms where the hands represent either the hands or the legs (e.g. NERVOUS; Figure 4.2c), on the other. In none of the cases is the body-anchored articulation random or coincidental; it is always iconically motivated.

Structurally, there appear to be two types of psych-verbs in NGT. The first category includes verbs that usually occur with two arguments in the clause, namely a subject Experiencer and an object Theme (LOVE, HATE, MISS; (1a), Oomen, 2017, p. 78). All other verbs typically select only one argument, which is the Experiencer (1b) (Oomen, 2017, p. 74). Just 18% of examples with verbs of the latter type also include a Theme argument (1c) (Oomen, 2017, p. 79). Unlike many spoken languages (see e.g. Belletti & Rizzi, 1988; Landau, 2010), NGT does not appear to have object-Experiencer psych-verb constructions.



Figure 4.2: Three body-anchored psych-verbs in NGT; from Oomen (2017, p. 70).

- (1) a. INDEX₁ **LOVE** LIVE INDEX₁ [NGT]
 'I love life.'
- b. ONE ^{RS}**AFRAID** [NGT]
 'One [of them] was afraid.'
- c. INDEX₁ **AFRAID** DRIVE-CAR [NGT]
 'I was afraid of driving a car.'

Subject drop occurs frequently in the dataset: of the 133 constructions with a psych-verb and a subject Experiencer that were analyzed, 72 involve a null subject.⁴ This observation in itself is hardly surprising, given that sign languages frequently allow for their arguments to be dropped (see Section 1.2.5). Interestingly, however, I observed that there appears to be a restriction with respect to the nature of the dropped subject, as just one of the 72 examples involves a dropped third-person subject, while first-person subject drop occurs 27 times in the data.⁵ The apparent restriction on third-person subject drop does not apply in clauses with role shift, where drop of a third-person referent was attested with high regularity (N=27). The findings are tabulated in Table 4.2, which additionally lists the frequencies of clauses with overt subjects. It can be observed that both first-person and third-person overt subjects, with the optional addition of role shift, are attested.

In informal terms, I propose in Oomen (2017) that body-anchoring of psych-verbs yields a default first-person interpretation in the absence of an overt sub-

⁴Clauses that also included a Theme/Stimulus argument were not analyzed for subject drop.

⁵There were no examples with second person subjects in the NGT data.

Table 4.2: (a) Overt and (b) null subjects in clauses with psych-verbs (N=133) in NGT as reported in Oomen (2017); rs = role shift.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	30	9	First	27	17
Third	17	5	Third	1	27

ject.⁶ This can be construed as an iconicity effect: the articulation of psych-verbs on the body is not random but iconically reflects either the metaphoric location of an emotion, or the external expression of an emotion. At the same time, the body naturally functions as the locus for first person. The concurrence of these two roles of the body, I argued, leads to the attested subject-drop pattern.

Since iconicity is claimed to have an impact on subject-drop constraints, it may be hypothesized that (i) all iconically motivated body-anchored verbs – and not just psych-verbs – are subject to the same constraint, and (ii) body-anchored verb constructions in DGS display the same pattern. I investigate in Section 4.3.3 whether the DGS corpus data provide evidence in support of these hypotheses.

4.2 Body-anchored verb forms


The DGS corpus data include 51 distinct body-anchored verb forms. All of these forms have in common that they are articulated on (or close to) the body. In this section, I investigate which other formational characteristics are frequently shared among verbs of this type, paying special attention to shared iconically-motivated properties. I propose a typology of body-anchored verb forms in Section 4.2.1. The purpose of this exercise is to categorize all 51 body-anchored forms based on recurring iconically-motivated formational properties. In Section 4.2.2, I use iconic mapping schemata (Taub, 2000, 2001) to characterize the iconic form-to-meaning mappings that distinguish the categories in the typology. Section 4.2.3 returns to the semantic map from Chapter 3 to examine how the different lexicalization patterns align with the semantic categories on the map.

A note of caution: as I previously discussed in Chapter 1.2.7, iconic properties of signs do not necessarily have to dictate meaning. Although the form of

⁶In Oomen (2017), I also present a formal account of this phenomenon; this analysis is detailed in Chapter 8.2.1.1.

iconic signs is *motivated* by iconicity, it cannot be predicted from it. Conversely, the meaning of a particular verbal form is not always guessable from its iconic components. As such, it is possible that an iconic aspect of a sign can clearly be associated with a particular meaning, yet the meaning of the sign does not actually comprise that facet of meaning. To give an example, a sign language may include a sign for 'bird' which makes iconic reference to flying, and which may be used to refer to any and all types of birds. Yet, we know that there are also species of bird that cannot fly. The point is that conventionalized forms might reflect aspects of meaning that may not always apply to the the meaning of the sign in the context in which it is used. Thus, when I discuss iconically motivated properties of body-anchored verbs in Section 4.2.1, I do not intend to claim that these properties necessarily form part of the meaning of specific signs and in all potential contexts. They are, however, able to inform us about common iconically motivated lexicalization patterns in body-anchored verb forms.

4.2.1 A typology of body-anchored verb forms

Figure 4.3 presents three examples of verb forms that involve an iconic body-to-body mapping. While the forms have this particular property in common, they each highlight different additional aspects of the event the verb denotes. Firstly, in the form DRESS₄ (Figure 4.3a), the hands of the signer iconically convey the configuration and movement of the hands of a person putting on a jacket or cardigan, thus representing a handling event. In the form DIE₂ (Figure 4.3b), on the other hand, the handshape seems to represent an instrument such as an axe or a large knife. As with DRESS₄, the movement of the action that is iconically reflected in the form – one of throat-cutting – is also preserved in the sign's articulation. In SCREAM (Figure 4.3c), there are yet other aspects of the denoted event being iconically represented. The outward movement appears to metaphorically reference the transmission of sound, with the widening -handshape reflecting an increase in volume, and the initial place of articulation signaling the origin of the sound.

Thus, the three forms in Figure 4.3 differ with respect to which facets of events are highlighted in the manual articulation of the sign. Still, for each verb holds that there is a direct form-to-meaning correspondence between (a location on) the body as part of the sign and the body of a referent. As previously discussed in Section 4.1.1, this basic insight is essentially shared by Meir et al. (2007). In

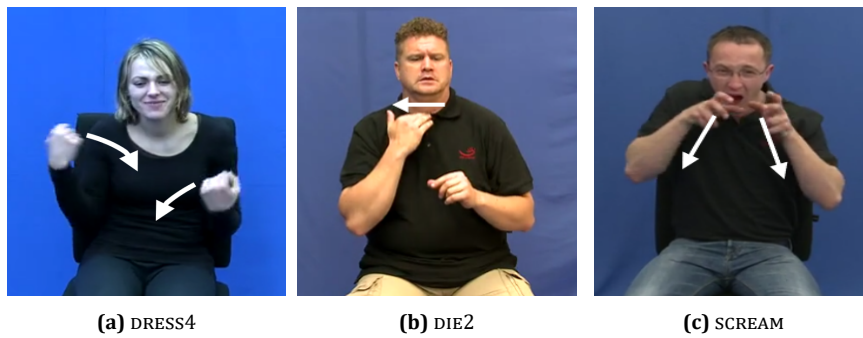


Figure 4.3: Three examples of body-anchored verb forms in DGS involving different iconic form-to-meaning mappings.

addition, the observations detailed above also align rather well with Meir et al.’s (2007) intuition that there is a division of labor between the body and the hands, where the body – being static – represents just a single aspect of the event denoted by the verb, while the hands – being dynamic – have the potential to represent a much broader range of event properties. A natural fallout from this is that different forms may involve different kinds of iconic mappings. Indeed, in addition to the patterns illustrated by the three forms in Figure 4.3, there are several others that can be observed in the DGS data.

Table 4.3 represents these recurring iconic mapping patterns in the form of a typology of body-anchored verbs. Verbs are categorized according to their canonical lexical forms, which excludes instances of verbs that are modified, for instance to express aspectual distinctions. This is important, because such modifications may obscure the lexical patterns the typology aims to characterize.

Table 4.3: A typology of body-anchored verb forms (N=51) in DGS based on iconic mapping patterns.

Cat. #	Body	Hand(s)	#
I	body \neq body	-	2
II	body = body	instrument / object	5
III		hand(s): holding	8
IV		hand(s): moving	7
V		body part: external expression	10
VI		body part: perception	5
VII		body part: internal experience	14

The primary division to be made is between forms that involve a body-to-body mapping (categories II-VII) and forms that do not (category I), indicated in the table with the dashed line. For the verbs that possess an iconic body-to-body mapping, six subtypes can be distinguished based on the properties of the manual sign. In a nutshell, forms in category II (such as *DIE2* in Figure 4.3b) make reference to the use of an instrument in the performance of an action on or involving the body. In forms from categories III (such as *DRESS4* in Figure 4.3a) and IV, the hands directly represent hands. Whereas category III verbs represent handling events, verbs in category IV do not; these involve the hands representing a simple motion event. Categories V, VI, and VII include forms in which the hands represent body parts other than the hands: category V verbs (such as *SCREAM* in Figure 4.3c) make reference to the external expression of an action performed by the body, category VI forms involve perception by a body part of an aspect in the external environment, and forms in category VII reference body-internal experiences and events not visible to the outside world.

Categories II to VII are not organized at random: the ordering reflects different degrees of involvement of the body vis-à-vis the external environment. That is, category II verb forms put the most emphasis on body-external facets of an event, while category VII verbs do so the least. The body, on the other hand, is least prominent in forms from category II but increases in prominence as one moves down the categories in the typology. Note that this typology is constructed solely on the basis of iconic properties of body-anchored verbs and not on their meaning or morphosyntactic characteristics. This is important, because in Section 4.2.3, I will investigate whether there is any correlation between the categorization I propose here and the classification on the semantic map from Chapter 3, which, if you recall, is based on cross-linguistic transitivity patterns. If there is a correlation, then this would further support the idea that there is a strong connection between the iconic properties of body-anchored verbs and their morphosyntactic qualities.

In the next section, each category in the typology is discussed in more detail, and illustrated with examples. For every category, iconic mapping schemes (Taub, 2001) are proposed to pinpoint the iconically motivated phonological properties that are shared by its members.

4.2.2 Iconic mapping patterns

As discussed, the most conspicuous observation with respect to body-anchored verb forms in DGS is that the majority of the 51 forms preserve the body of the signer as a meaningful part of their form. Just two verb forms, both denoting the same meaning, deviate from this general pattern, as they seemingly do not involve a one-to-one mapping of the body to any aspect of the verb's meaning (Section 4.2.2.1). All other 49 body-anchored verb forms do involve an iconic body-to-body mapping (Section 4.2.2.2 to 4.2.2.7), but differ from each other with regard to which event aspects are iconically represented by the hands.

4.2.2.1 Category I

The two verbs without a body-to-body mapping (see Figure 4.4 for illustrations) make up category I (2).

- (2) **Category I** | no body-to-body mapping
LIVE1, LIVE2





(a) LIVE1




(b) LIVE2

Figure 4.4: The two body-anchored verb forms in DGS without an iconic body-to-body mapping.

It is, of course, possible that these forms have undergone a loss in iconicity as a result of phonological reduction processes. Taub (2001), for instance, reports that the ASL sign HOME – which happens to be closely semantically related to LIVE – is a compound sign made up of the signs EAT and SLEEP, which are both highly iconic. Taub (2001) claims that phonological processes have led to HOME being

articulated with a -handshape moving from the cheek near the mouth to the cheek near the ear. As such, the locations of the individual signs have been preserved but the -handshape with which SLEEP is otherwise articulated, has been replaced by the handshape used to sign EAT. It is not unthinkable that the verb forms in Figure 4.4 have undergone similar phonological alteration processes at the cost of iconicity. Still, if forms are altered to the degree that a body-to-body mapping is no longer evident, it seems reasonable to suggest that such forms no longer involve the body of the signer in their morphophonological representation in the same way that other body-anchored verb forms do.


4.2.2.2 Category II

Verb forms of category II (3) make reference to an action being performed on the body with the use of a tool or instrument. Three such forms are illustrated in Figure 4.5. Firstly, with its -handshape, the form DIE3 (Figure 4.5a) appears to reference a long, sharp tool such as a knife.⁷ Secondly EAT3 (Figure 4.5b) references the movement of a fork toward the mouth. Finally, SHAVE1 (Figure 4.5c) appears to allude to the shape of a shaving machine.⁸

(3) **Category II** | hand(s) = instrument / object
DIE2, DIE3, EAT3, SHAVE1, SHAVE2

Table 4.4 presents an iconic mapping for verb forms of category II. The representation focuses in particular on the specifications of the three main phonological parameters *handshape - location - movement* and the role of the body; the mappings for verb forms of the other categories will adhere to the same structure.

In each category II form, the use of a whole-entity handshape representing an instrument or tool may be said to lead to an iconic interpretation of the location of the verb as the point of contact between the instrument and the body, and the movement of the verb as the movement trajectory of the instrument on or toward the body. In turn, this constellation of specifications for the manual sign,

⁷DIE2, depicted earlier in Figure 4.3b, is similar in form with the exception of the -handshape, thus appearing to reference a differently shaped tool.

⁸It should be noted that the hand in SHAVE1 could also be referencing a hand holding a razor or electric hair trimmer rather than the tool itself. If that were to be the case, the verb might be better classified in category III. Nothing substantial hinges on this, however. It just shows that the categories are closely related and may partially overlap – thus providing more motivation for the ordering of the typology as it is proposed in Section 4.2.1.

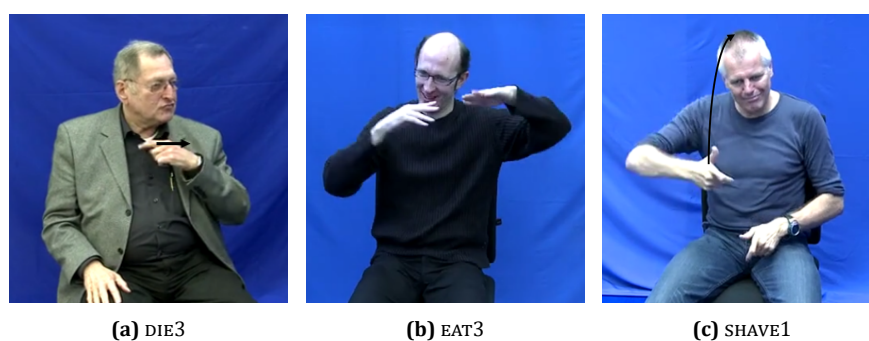


Figure 4.5: Three category II body-anchored verb forms, in which the hand(s) iconically reference an action performed on the body with the use of a tool.

Table 4.4: Iconic mapping for category II body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : whole entity	Instrument
<i>Location</i> : on/close to body	Locus of contact between instrument and the body
<i>Movement</i> : contact/tracing	Instrument makes contact with or traces the body
<i>Body</i>	Body of an undergoer

which iconically represents the way an instrument impacts on the body, causes the body to represent an undergoer-type referent. Note that the technique used in forms from this class, i.e. hands representing objects, is a common one in DGS as well as other sign languages; König, Konrad, and Langer (2008) refer to it as the substitutive technique.

4.2.2.3 Category III

Category III includes forms in which the hands iconically map onto hands holding an object, which König et al. (2008) call the manipulative technique. All verb forms of this type are listed in (4). EAT1 and EAT2 (Figure 4.6a) reference a hand holding food, while DRINK (Figure 4.6b) references a hand holding a glass, cup, or bottle. DRESS1 (Figure 4.6c) makes reference to the act of putting on an item of clothing such as a sweater by pulling it down over the torso with the hands. The forms DRESS2, DRESS3, and DRESS4 (Figure 4.3a) similarly reflect the act of putting on certain types of clothes. HUG2 is a somewhat special case: it involves

the arms, hands in fist configuration, crossed in front of the signer’s chest, as if to pull someone closer. This can be construed as some sort of handling event, with the difference that the arms rather than the hands are doing the holding.

- (4) **Category III** | hand(s) = hand(s): holding
 DRESS1, DRESS2, DRESS3, DRESS4, DRINK, EAT1, EAT2, HUG2



Figure 4.6: Three category III body-anchored verb forms, in which the hand(s) iconically map onto hand(s) holding an object.

Table 4.5 presents the iconic mapping for verb forms of category III. The mapping patterns are similar to those for category II verbs, with the crucial difference that the hands represent hands and not instruments. Note that the mapping in Table 4.5 subtly but importantly differs from the iconic mapping Meir et al. (2007, p. 540) propose for the ISL verb EAT (Table 4.1): the authors suggest that the “mouth of signer” maps onto the “mouth of eater, agent”. I propose a different division: the hands represent those of an agent, while the body represents a patient or undergoer. In other words, the hands and the body belong to the same referent but participate in the event denoted by the verb in a different way: the hand holds food and moves it to the mouth – an agentive act – while the body is the receiver of the food that is held by the hand, making it an undergoer-type of participant in the event. Again, let me reiterate that I do not wish to make any claims about argument structure here, i.e. I am not arguing that EAT1 and EAT2 must be transitive events involving an Agent and an Undergoer. I am merely investigating which kind of event properties are iconically represented in a verb’s form. Whether or not these properties are reflected in a verb’s valency is a separate (albeit possibly connected; see Chapter 3) matter.

Table 4.5: Iconic mapping for category III body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape: handling</i>	Hand(s) holding an object
<i>Location: on/close to body</i>	Locus of contact between hand(s) holding object and the body
<i>Movement: contact/tracing</i>	Hand holding object makes contact with or traces the body
<i>Body</i>	Body of an undergoer

The use of instrument and handling forms are both known lexicalization strategies in sign languages, and they also occur in gesture (Padden et al., 2013).⁹ In an elicitation task, Padden et al. (2013) presented signers of three sign languages (ABSL, ASL, and New Zealand Sign Language (NZSL)) with pictures of hand-held manufactured tools and show that participants in the various groups differ in their preferred lexicalization strategy.¹⁰ Signers of ABSL and ASL show a preference for using instrument handshapes, while NZSL signers prefer handling handshapes, although instrument forms also occur fairly often. Other strategies, such as fingerspelling or tracing the shape of an object, occurred but quite rarely. In sum, the results show that there are sign-language specific preferences for naming tools, but that there are clearly two strategies that are favored overall: the use of handling or instrument forms. This latter observation leads the authors to suggest that “tools as a category of stimuli strongly elicit forms exhibiting human agency” (Padden et al., 2013, p. 303).

In this light, it becomes interesting to consider whether the body-anchored verb forms that involve instrument or handling handshapes denote concepts involving a human agent manipulating or using a tool or object. This appears to be the case for the various forms of EAT, DRINK, DRESS and SHAVE, and probably also HUG2. However, it is a difficult claim to defend for the forms DIE2 and DIE3, since

⁹The same kinds of handshapes are also used in classifier constructions (see e.g. Benedicto & Brentari, 2004; Boyes Braem, 1981; Schick, 1990; Supalla, 1986; Zwitserlood, 2003), although not all researchers make a distinction between the two types.

¹⁰In addition, Padden et al. (2013) investigated two groups of hearing non-signers: American and Bedouin participants. The latter form part of a shared signing community (Kisch, 2008), in which ABSL is used by many (though not all) community members – both deaf and hearing – due to the high prevalence of congenital deafness. The results show that both groups have a preference for handling forms over instrument forms, and in addition make use of a number of other strategies, such as tracing the shape of an object or touching a part of the body where the relevant object is often found or used.

dying does not involve an agent at all. As described earlier, these two forms reference the slitting of a throat (see Figure 4.3b and Figure 4.5a), having handshapes that represent tools (which, by inference, are handled by an agent) causing a referent's death. Perhaps the existence of these forms is simply another expression of Padden et al.'s assertion that there is a tendency for signs to iconically represent human agency – even when the concept the sign is meant to denote does not actually involve an agent.¹¹ However, it might also be the case that DIE2 and DIE3 are exceptions to an otherwise consistent pattern in which verb forms (may) iconically represent the thematic roles that are involved in the event denoted by the verb's meaning (for more on this, see Section 4.2.3). A possible source for this exception could be the gestural roots of these forms.

Alternatively, DIE2 and DIE3 may have a specialized meaning restricted to specific contexts, e.g. when a referent dies as a result of some external force, as with a murder. Indeed, there are examples for which such an explanation makes sense. In (5a), for instance, the signer speculates about Princess Diana's death, arguing that it was premeditated. Such a context might trigger the use of this form rather than the more frequently used DIE1, which is a neutral verb. However, not all examples with DIE2 or DIE3 fit this pattern. In (5b), the verb appears to simply mean 'die', without the cause of death being mentioned or indeed bearing any relevance.

- (5) a. INDEX_a D **DIE2** MUST INDEX_a \ IF WANT NOT REVEAL INDEX_a
 'She [Princess Diana] had to die. Otherwise she would have revealed too much.' [koe05-A-07:06.05]
- b. INDEX₁ BE-SAD1 INDEX₁ \ BECAUSE INDEX₁ ^{'Vater'} MUSTACHE EARLY **DIE2**
 'For me, it was sad that my father died so early.' [koe17a-B-08:43.05]

I revisit some of the issues discussed above in Section 4.2.3.

4.2.2.4 Category IV

Like the verbs of category III, all the verb forms in category IV (6) present a one-to-one mapping between the hands of the signer and the hands of a referent. Dif-

¹¹Indeed, Ortega, Sümer, and Özyürek (2017, p. 1) demonstrate that deaf children acquiring a sign language have an initial preference for using handling handshapes because "they give [the children] the opportunity to link a linguistic label to familiar schemas linked to their action/motor experiences".

ferent for forms in this category is that the hands do not reference an action performed on the body; they merely express some sort of movement associated with an action. As such, the body and the hands form a unity; they participate in the event as one. ASK-FOR, for instance, references a begging gesture, TALK represents signing, and FEEL-COLD involves two fist which shake to express shivering (Figure 4.7). RUN1 and RUN2 reference the way the arms move by the side of the body when a person is running. Finally, HEAR2 reflects the act of cupping one’s hand beside one’s ear to pick up sound.

(6) **Category IV** | hand(s) = hand(s): moving
 ASK-FOR, FEAR3, FEEL-COLD, HEAR2, RUN1, RUN2, TALK

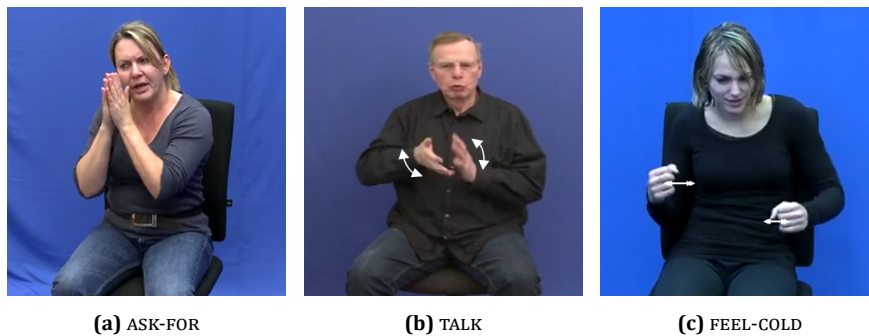


Figure 4.7: Three category IV body-anchored verb forms, in which the hand(s) iconically map onto hand(s) performing an action which does not affect the body.

Table 4.6 represents the iconic mapping for category IV verb forms. It can be observed that, despite the fact that category III and category IV verbs both involve a hands-to-hands mapping, verb forms from the two categories involve very different iconic articulator-to-source mappings – thus reflecting that they highlight markedly different event properties.

Table 4.6: Iconic mapping for category IV body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> body part (hands)	Hand(s) performing action
<i>Location:</i> neutral space	Hand(s) performing action at specified locus
<i>Movement:</i> final contact / tracing	Hand(s) moving to perform action
<i>Body</i>	Body of an agent

4.2.2.5 Category V

Categories V, VI, and VII include verbal forms in which the hands represent (or point toward) parts of the body other than the hands themselves. Verbs in these three categories differ with respect to prominence of the body vis-à-vis the external environment. The most body-internal events are represented by verb forms in category VII. Forms in category V and VI, on the other hand, still involve (interaction with) the external environment to some degree.


Category V includes verb forms which make reference to the externally visible or otherwise perceivable expression of a body-internal experience. LAUGH2 (Figure 4.8a) and LAUGH3, for instance, reflect the heaving and falling of the chest as can be observed when a person is laughing. LAUGH1 reflects the way the mouth moves while laughing, FEAR2 references shaking legs, and BE-SAD3 represents crying. The forms SAY1, SAY2 (Figure 4.8b), SCREAM, TELL1 (Figure 4.8c), and NAME all reference the production of sound or speech.

(7) **Category V** | hand(s) = body part: external expression

BE-SAD3, FEAR2, LAUGH1, LAUGH2, LAUGH3, NAME, SAY1, SAY2, SCREAM, TELL1




Figure 4.8: Three category V body-anchored verb forms, in which the hand(s) represent a body part performing an action perceived in the external world.

Table 4.7 presents the iconic mapping for verb forms of category V. The hand(s) either represent or, in the case of forms with a -handshape (e.g. SAY1; HEAR1), point toward body parts¹². The place of articulation of the forms in category V

¹²König et al. (2008) consider pointing to be a separate image-producing technique, which they refer to as the indexing technique.

corresponds to the location of the relevant body parts. In the case of a path movement, as in e.g. SCREAM and NAME, the trajectory of the movement starts from the body and signifies a form of emission from the relevant body part. Other forms have a tracing movement indicating manner of motion of the relevant body part, as in e.g. LAUGH2. The combined properties of the manual sign lead the body to represent an agent- or experiencer-like referent.

Table 4.7: Iconic mapping for category V body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> various / 	Body part performs action
<i>Location:</i> body	Locus of body part which performs action
<i>Movement:</i> initial contact / tracing	Movement of body part(s)
<i>Body</i>	Body of an agent

4.2.2.6 Category VI

In verb forms of category VI, the hands make reference to a sensory organ involved in a perception event. Verbs of this category are listed in (8). The forms LOOK-AT1, HEAR1, BE-DEAF (Figure 4.9a), SEARCH-FOR (Figure 4.9b), and SMELL2 (Figure 4.9c) all involve the hand(s) representing or pointing toward sensory organs such as the eyes, ears, or nose.

- (8) **Category VI** | hand(s) = body part: perception
BE-DEAF, HEAR1, LOOK-AT1, SEARCH-FOR, SMELL2

Table 4.8 presents the iconic mapping for Category VI verb forms. The hand(s) either represent a sensory organ directly (e.g. SEARCH-FOR) or point toward it (e.g. BE-DEAF). The movement of the sign may represent the direction of perception, e.g. the direction of eye gaze.¹³ These properties taken together make the body represent an experiencer.

¹³Note that none of these verbs have a clear path movement, but e.g. SEARCH-FOR involves a circling movement to indicate drifting eye gaze.

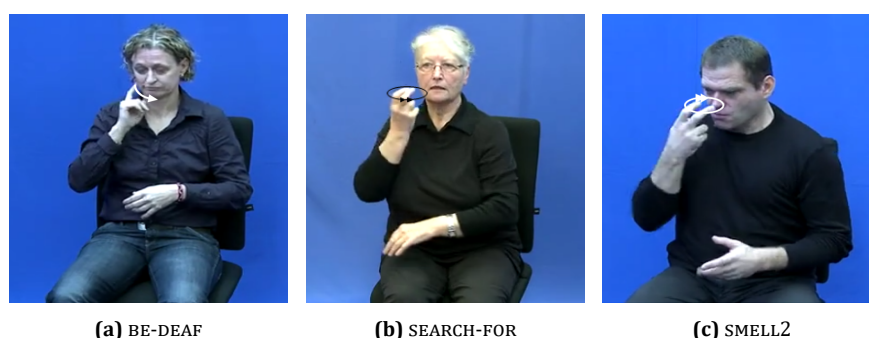



Figure 4.9: Three category VI body-anchored verb forms, in which the hand(s) represent or point toward a body part that is a sensory organ.

Table 4.8: Iconic mapping for category VI body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> various / 	Sensory organ perceives
<i>Location:</i> body	Locus of sensory organ
<i>Movement:</i> initial contact	Direction of perception
<i>Body</i>	Body of an experiencer

4.2.2.7 Category VII

Finally, verb forms in category VII (9) make iconic reference to a body-internal event. BE-SAD1 (depicted in Figure 4.10a), BE-SAD2, FEEL-PAIN and FEAR1 reference a feeling of heartache or nausea associated with sadness, hurt or fear, respectively. LIKE is articulated at the same location but with a different metaphoric connotation, i.e. the heart as the locus of feelings of love. DISLIKE involves a movement away from the signer's chin as if to express disgust. BE-HAPPY is articulated on the chest and involves an upward movement to metaphorically reference a positive feeling, KNOW1, KNOW2 (Figure 4.10b), and THINK reference the brain as the locus of cognition. BE-THIRSTY references a dry throat (Figure 4.10c), while BE-HUNGRY makes reference to a rumbling stomach. Finally, FEEL-HOT and FEEL-WARM appear to reflect a heated face.

(9) **Category VII** | hand(s) = body part: internal event

BE-HAPPY, BE-HUNGRY, BE-SAD1, BE-SAD2, BE-THIRSTY, FEAR1, FEEL-HOT, FEEL-PAIN, FEEL-WARM, KNOW1, KNOW2, LIKE, DISLIKE, THINK

Table 4.9 presents the iconic mapping for verb forms of category VII. The com-

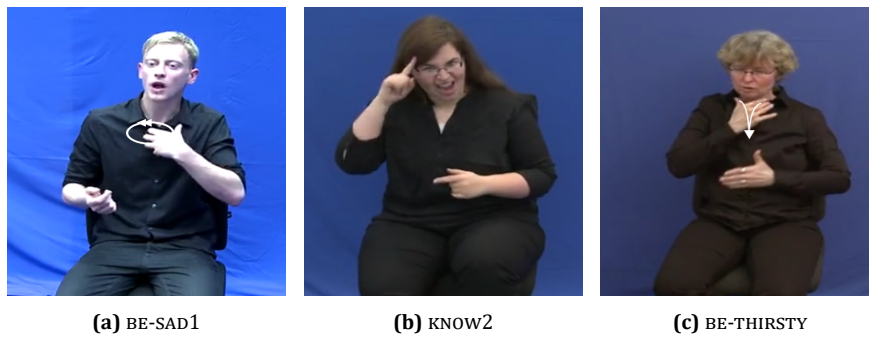


Figure 4.10: Three category VII body-anchored verb forms, in which the hand(s) represent body parts performing an internal action.

bined properties of the manual sign signal that the form denotes a body-internal experience. The handshape tends to be rather abstract but makes direct contact with the body. The verb’s movement is either reduplicated or it traces part of the body, but it does not involve a path movement in space. Taken together, these properties underscore the centrality of the body in the concepts denoted, while the role of the external environment is minimized. The body thus represents an experiencer-like argument.

Table 4.9: Iconic mapping for category VII body-anchored verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> various	Various
<i>Location:</i> body	Locus of event
<i>Movement:</i> contact / tracing	Event contained in body
<i>Body</i>	Body of an experiencer

To sum up, there are different lexicalization strategies possible for body-anchored verbs but what all of them have in common (barring two exceptions) is that the body iconically maps onto the body of a particular referent. At the same time, the body is not involved in the event denoted by the verb in the same way across categories. In this regard, categories II to VII in the typology can be seen as forming a continuum in which the hands reference increasingly less agent-like qualities while the body becomes increasingly more experiencer-like. Also note that toward this end of the continuum, we may witness more forms – particularly

psych-verbs – that involve metaphor or metonymy.¹⁴ This observation fits quite well with the notion that body-internal experiences, such as emotions, are inherently somewhat more abstract. Use of metaphor is a way to more clearly delineate such experiences (see e.g. Lakoff & Johnson, 1980/2003).

4.2.3 Back to the semantic map

In Section 4.2.1, I presented a classification of body-anchored verb forms based on their iconically motivated properties, and I discussed and illustrated each category in more detail in Section 4.2.2. With the exception of category I forms, which do not include the body as a meaningful part of the sign, the categories are organized in the typology such that the ordering reflects the body adopting an increasingly more prominent role, with body-external factors becoming less prominent as one moves along the continuum.

Figure 4.11 displays the same semantic map for body-anchored verbs from Chapter 3, but with added color-coding to reflect the different verb form categories.

Overall, it can be observed that the preferences for lexicalization patterns differ among the three horizontal dimensions on the map. Firstly, on the middle dimension, the verb forms in the ‘Reflexive/Middle’ and ‘Spontaneous’ categories are category II or III forms, in which the hands represent or handle an object. Secondly, the forms in the ‘Pursuit’, ‘Motion’, and ‘Interaction’ classes on the top strand are of category V, VI, or VII, in which the hands represent body parts. Finally – and most strikingly – the continuum of verb forms is rather nicely reflected on the lower strand. The ‘Affected Agent’ category on the far left includes some lower-category forms (categories II and III) as well as some forms from category V. As one moves further toward the right, verb forms from the highest two categories are attested with increasing frequency. The exceptions appear to be forms from category IV (hands representing hands), which are somewhat randomly scattered across the lowest dimension.¹⁵

Recall from Chapter 3 that the categories along the bottom dimension are ordered such that the verbs contained in these semantic classes denote events in

¹⁴In Taub’s 2001 model, such forms involve two mappings: first an iconic mapping from articulators to source, and then a metaphoric mapping from source to target.

¹⁵The only two non-iconic body-anchored verb forms (category I) are classified as intransitives, on the right pole connecting all three dimensions on the map. The adjectival predicate BE-DEAF (category V) is also present in this category.

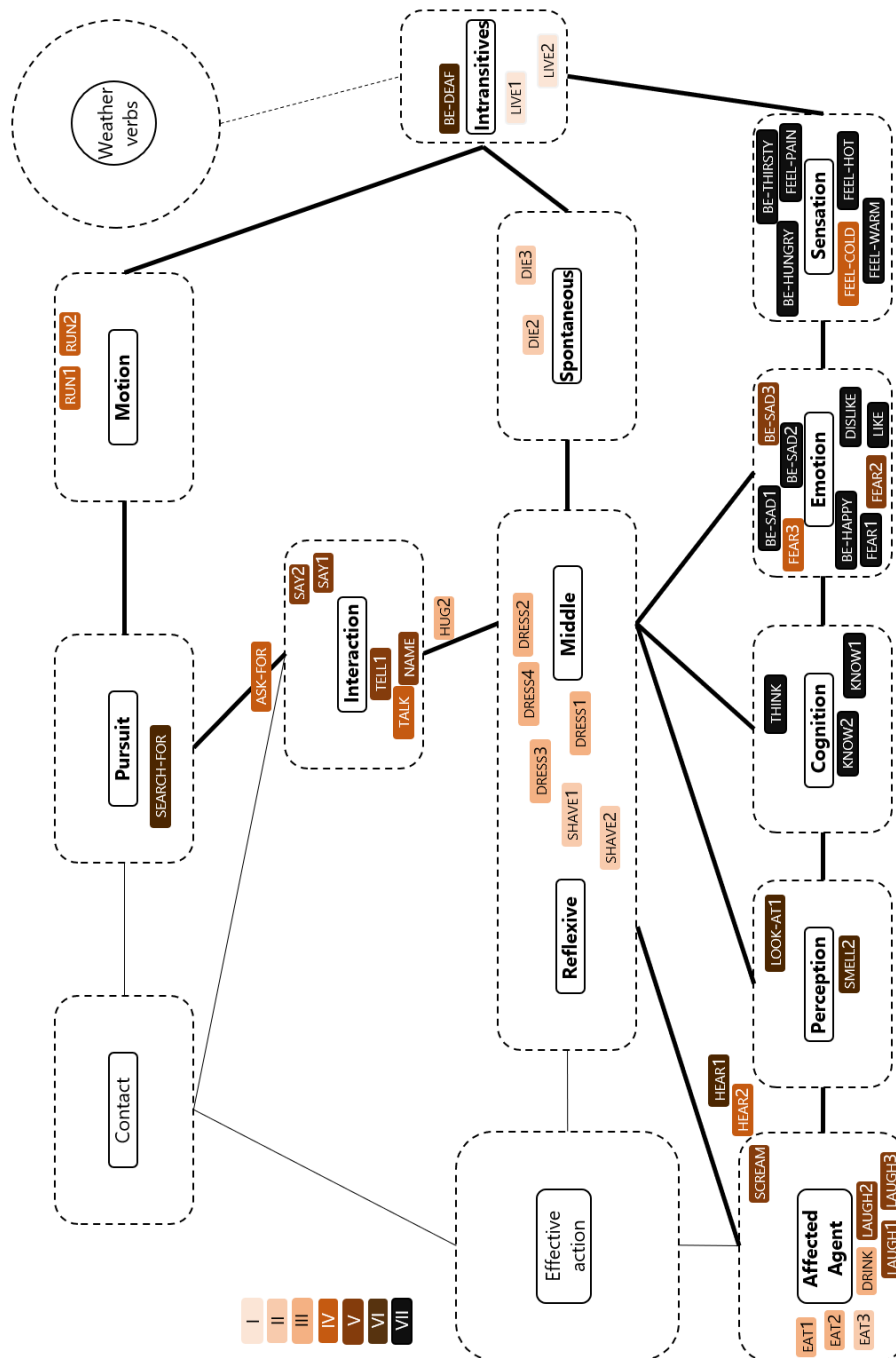


Figure 4.11: The semantic map for body-anchored verbs, color-coded to reflect the categories from the typology in Table 4.3.

which A (for Agent; Dixon, 1979) becomes increasingly more experiencer-like and O (for Object) behaves increasingly more like a causer. Indeed, in the typology of body-anchored verb forms, verbs from the higher categories make explicit iconic reference to the experiencer-hood of the A argument. Thus, this aspect of the semantics of verbs in the classes on the lower strand of the semantic map is often emphasized in their forms. However, properties of a stimulus or causer do not appear to be iconically expressed in verb forms from these categories.

Overall, the map in Figure 4.11 suggests that there is some correlation between verb semantics and preferred iconic lexicalization pattern, although there is often a choice between several iconic form-to-meaning mapping techniques. The latter observation is in line with the results of a study conducted by Padden et al. (2013), in which signers are shown to employ both instrument and handling forms to represent the same objects. An interesting question to consider is whether properties of real-life events motivate the choice for one form over another. I already discussed the case of DIE2 and DIE3, which reference a human agent – a killer – in their form even though they may occur in contexts in which there is no such referent. Yet, it is possible that such forms are, indeed, favored in contexts in which this referent is relevant. A detailed examination of this hypothesis falls outside the scope of this thesis, but may be explored in future work.

4.2.4 Interim summary

There are different semantic properties that may serve as the source for iconic form-to-meaning mappings. I proposed a typology that distinguishes lexicalization patterns in which different event properties are highlighted. The role of the body is the product of the constellation of iconically motivated features that make up the manual articulation of the sign. For instance, in forms referencing tool use through the movement, location, and shape of the hand, the body can be interpreted as an undergoer-type argument. Verbs that emphasize a bodily experience in their manual articulation, on the other hand, cause the body to represent an experiencer-like argument.

The theoretical question the discussion in this section raises is whether the grammar pays attention at all to the iconic form-to-meaning patterns I discussed. Based on the DGS data, I suggest that there is at least one way in which it does. This matter is taken up again in Chapter 8; Section 4.3.3 precludes this discussion by investigating subject-drop patterns in body-anchored verb constructions.

Following my previous work on subject drop in psych-verb constructions in NGT (Oomen, 2017), it is hypothesized that only first-person subject drop is allowed – precisely because an automatic iconic association is made between the body of the signer and first person.

4.3 General sentence structure patterns

The previous section considered the formational properties of body-anchored verbs. In this section, I focus on the morphosyntactic behavior of these verbs.

I discuss the constituent order of sentences with body-anchored verbs in Section 4.3.1. It has been claimed before that DGS has basic SOV order (see e.g. Bross & Hole, 2017; Pfau & Glück, 2000; Steinbach & Herrmann, 2013). In addition, it has been claimed for a number of sign languages that verb type affects constituent order, with plain verbs favoring SVO order and agreeing verbs SOV (see e.g. Sze, 2003 for Hong Kong Sign Language, Vermeerbergen, van Herreweghe, Akach, and Matabane, 2007 for Flemish Sign Language, Kegl, 2004a, 2004b for ASL, and Milković, Bradarić-Jončić, and Wilbur, 2006 for Croatian Sign Language).¹⁶ Discussions of constituent order with neutral and agreeing verbs follow in Chapter 5.3.1 and 6.3.1, thus enabling a comparison in Chapter 7.3 to establish whether the same division holds for DGS.¹⁷ A potentially interesting point of divergence between the present study and others is that other authors (with the exception of Vermeerbergen et al., 2007, who classify neutral verbs that have the ability to be localized as non-plain verbs) do not explicitly distinguish between body-anchored and neutral verbs.

¹⁶Napoli and Sutton-Spence (2014) survey reports from 42 sign languages and confirm that SOV order is found across sign languages in clauses with agreeing verbs, spatial verbs, as well as other modifiable predicates such as classifiers. From this observation, the authors conclude that “if an argument affects the phonological shape of the [verb], it precedes [the verb]” (Napoli & Sutton-Spence, 2014, p. 3). This contrast with plain verbs, which the authors claim are “[...] the only verbs whose phonological shape is not affected in an iconic way by their arguments” (Napoli & Sutton-Spence, 2014, p. 12). Indeed, they report that across sign languages, both SOV and SVO order are attested in constructions with plain verbs. I should note here that I will argue in Chapter 8.2 that body-anchored verb forms *do* iconically make reference to one of their arguments, but only to their subject.

¹⁷It has previously been argued in the literature (e.g. Chen-Pichler, 2008; Fischer, 1975, 2014; Kimmelman, 2012) that one should only consider plain verbs when determining basic constituent order in a sign language, as these are the least morphologically complex and since morphological complexity (e.g. agreement marking) could license freer word order; see Chapter 8.3.1 for further discussion in light of the DGS corpus results.

In Section 4.3.2, valency patterns are discussed. Given that – unlike agreeing verbs – body-anchored verbs cannot mark objects in their form, it could be stipulated that verbs that are body-anchored are more likely to occur in constructions that lack an object altogether. Comparative analysis of the discussion in this section and in Chapter 6.3.2 will reveal whether there is any truth to this hypothesis.

Finally, Section 4.3.3 discusses subject drop. Following Oomen (2017), it is hypothesized that null non-first person subjects do not occur in clauses with body-anchored verbs. Confirmation of this pattern would provide further evidence that body-anchoring triggers an automatic association with first person. The results will be set off against those for neutral verbs and agreeing verbs (Chapters 5.3.4 and 6.3.4), where different findings are expected under the same hypothesis.

4.3.1 Constituent order patterns

Recall from Chapter 2.3.2 that I made annotations indicating constituent order for every example in the corpus data. Different types of verbs and predicates, arguments, modals and auxiliaries are all distinguished with dedicated labels. Special symbols indicate prosodic boundaries ('\'), the start of dependent clauses ('#'), and role-shift boundaries ('[]'). Technically, role shift has nothing to do with constituent order as it is a simultaneous marking strategy. However, since it is unknown whether role shift may impact on constituent order in any way, I decided to include the information on role-shift boundaries in the analysis.

As for prosodic boundaries, sentences with identical constituent orders apart from the presence vs. absence of a prosodic boundary, as in (10a) vs. (10b), are collapsed into a single category whenever the boundary precedes or succeeds a clausal complement. The rationale behind this decision is that such sentences can be assumed to always involve a syntactic clausal boundary, even when this is not signalled overtly by means of prosodic markers. In contrast, a prosodic boundary in (purported) monoclausal sentences may serve to signal some other phenomenon, such as topicalization. As such, potentially valuable information could be lost if the information on prosodic boundaries in such constructions were ignored.

- (10) a. INDEX₂ **KNOW2** \ FOURTEEN_a FOURTEEN_b INDEX₂ BONUS OBTAIN
 'You know you can get the 14/14 bonus for it.' [koe05-B-02:30.45]

- b. INDEX₁ $\frac{\text{hs}}{\text{KNOW}}$ RIGHT
 'I don't know if that's right.' [koe19a-B-04:04.80]

Constituent types such as conjunctions or adjuncts were also labeled, but they are not taken into account. That is, I only consider the relative ordering of verbs, arguments, modals/auxiliaries, and boundaries in the analysis.

I should explicate a number of points before discussing the results. Firstly, recall that the labeling of arguments occurred based on their semantic function in the clause and not on the basis of syntactic tests, which are impossible to apply to corpus data. Secondly, the discussion of constituent-order patterns in this section is meant to be descriptive in nature. As such, I treat certain patterns as distinct that could actually be grouped together on the basis of their formal characteristics. I already mentioned that I distinguish clauses that have the same constituent order but which differ with respect to presence of role shift, for instance. In a similar vein, I treat clauses with the orders S V, V S, and S V S as distinct. Given that the subject occurs in sentence-initial position in the majority of cases (see Section 4.3.1.1), it is not unreasonable to assume that a postverbal subject constituent, which tends to be a pronominal sign, is actually a copy of the preverbal subject. Such doubling has previously also been described for e.g. ASL (Padden, 1988; Wilbur, 1999) and NGT (Bos, 1995; Crasborn, van der Kooij, Ros, & de Hoop, 2009).¹⁸ Similarly, there is not much on the surface to suggest that locative objects as in (11a) differ from regular objects as in (11b) apart from their semantics, yet I distinguish between objects of these two types in the analysis. It is possible that there are ordering differences with respect to these two types of constituents.¹⁹

- (11) a. POSS₁ PARENTS **LIVE1** INDEX S V O/Loc
 'My parents lived there.' [fra05-B-02:01.35]
 b. INDEX₁ **SEARCH-FOR** EXPENSIVE FAX S V O
 'I searched for the most expensive fax machine.' [lei08-B-02:35.65]

Thus, I do not collapse constituent orders into categories that may encompass

¹⁸To be more precise, where Bos (1995) argues that only subjects can get doubled in sentence-final position in NGT, Crasborn et al. (2009) claim that the type of constituent which may undergo this form of doubling is actually a topic (which might thus also be an object).

¹⁹Unfortunately, the data with body-anchored verbs do not contain enough examples with locative objects to assess this hypothesis. However, see Chapter 5.3.1 and 6.3.1 for discussions on constructions with locative constituents and neutral or agreeing verbs.

more than one order, even if there might be good reason to do so, because my main interest is to be as thorough as possible in describing patterns in the data.

Given the discussion above and the fact that I analyzed naturalistic corpus data (see also Oomen & Pfau, 2017), it should not come as a surprise that many different constituent orders were attested in constructions with body-anchored verbs – and many of those orders were attested only once. For the sake of illustration, the graph in Figure 4.12 represents all the constituent orders attested in main clauses with body-anchored verbs on the x-axis, set off against their frequency on the y-axis. It can be observed that only about a third of the attested orders occur more than once.

Sections 4.3.1.1 and 4.3.1.2 discuss constituent order patterns in main and dependent clauses, respectively.

4.3.1.1 Main clauses

In total, 100 different constituent orders were attested in main clauses with body-anchored verbs. Included in these numbers are also main clauses that take a complement clause ('CO'). 60 orders are attested only once, while 17 orders occur twice; these are not further discussed. Table 4.10 lists all constituent orders that were attested three times or more. For a legend of the annotation labels, see Chapter 2.3.2.

Table 4.10: Constituent orders in main clauses with body-anchored verbs (N=494) with a frequency of three or more (N=400). Square brackets indicate boundaries of role shift marking; backslash indicates prosodic boundary.

Order	#	Order	#	Order	#
[V V']	3	[V S]	5	V CO	20
O \ S V	3	O V	5	[V]	22
S O V	3	S V S	6	V S	28
S V CO V	3	V O	11	S [V]	37
S V V'	3	V S CO	12	S V CO	41
V [CO]	3	S V O	17	V	48
CO S V	4	[S V]	18	S V	86
S V O/Loc	4	S V [CO]	18		

SV is by far the most frequently attested order: it occurs in 86 out of 494 main clauses with body-anchored verbs (17.4%). In addition, clauses with SV order with role-shift markers accompanying the verb or both the subject and the verb

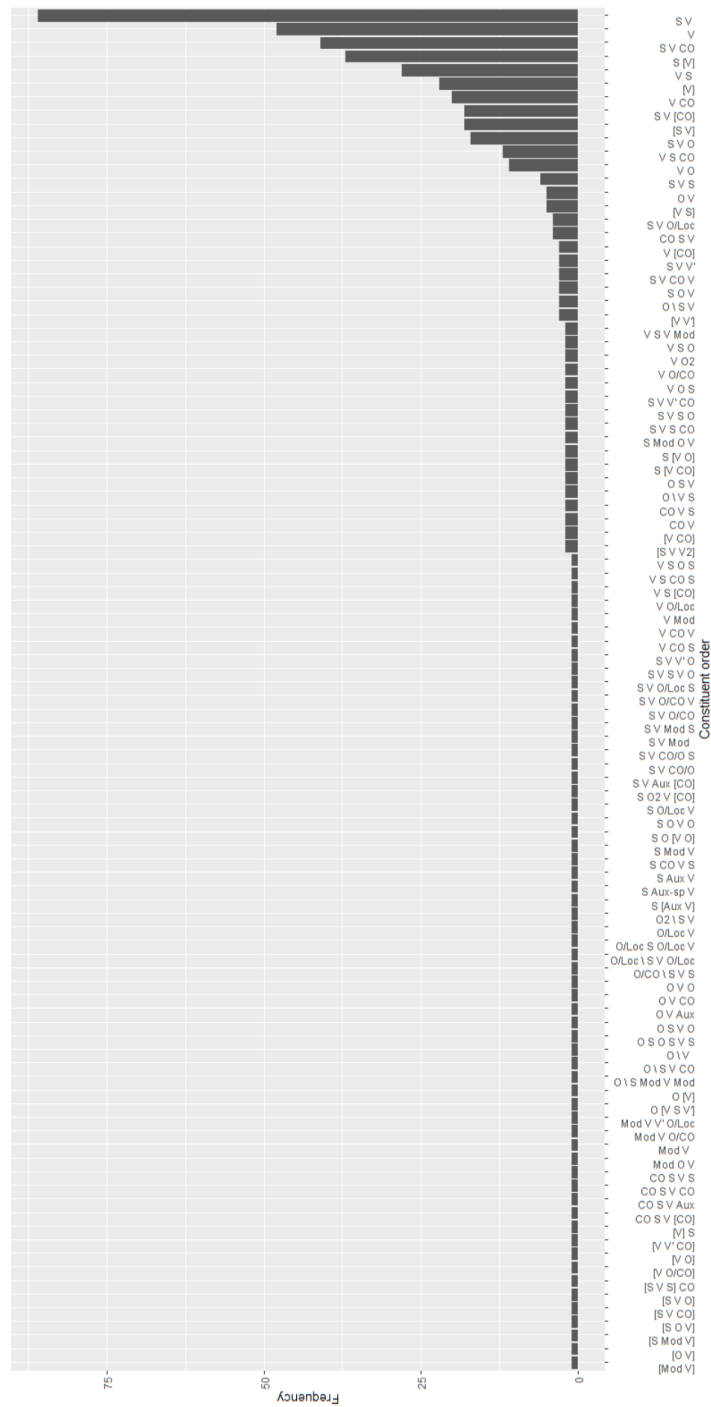


Figure 4.12: Frequency counts of constituent orders in main clauses with body-anchored verbs (N=494).

occur 37 (7.5%) and 18 (3.6%) times, respectively. Examples demonstrating these three sentence patterns are presented in (12). Remember that elements such as adverbs or negative particles are not considered in the analysis, but they may be part of the examples (as in (12a)).

- (12) a. INDEX₁ **LAUGH1** $\frac{hs}{NOT}$ S V
 'I couldn't laugh about it.' [koe09-B-01:00.80]
- b. INDEX₁ $\frac{rs}{\text{SCREAM}++}$ S [V]
 'I was screaming.' [stu18-B-01:40.80]
- c. INDEX₁ $\frac{rs}{\text{RUN}2++}$ [S V]
 'I'd just keep running.' [hb06b-A-06:06.35]

The reverse order, V S, is also attested with some regularity, occurring a total of 28 times (5.7%) without role-shift markers (13a), and an additional five times with role-shift markers. The data also include six examples in which the subject is articulated both before and after the verb, as in (13b).²⁰

- (13) a. **BE-DEAF** INDEX_a V S
 'He was deaf.' [koe11-A-05:28.00]
- b. $\frac{re}{\text{INDEX}_2 \text{KNOW}1 \text{INDEX}_2}$ S V S
 'You know them, right?' [hb03-B-04:35.10]

Taken together, clauses that contain just a subject and a verb account for a sizeable proportion of all main clauses with body-anchored verbs, adding up to a total of 35.6%.

Main clauses that include just a verb account for 9.7% (without role shift; (14a)) and 4.5% (with role shift; (14b)) of the data. These examples lack (at least) an overt subject. For a description of subject-drop patterns, see Section 4.3.3.

- (14) a. **BE-HAPPY** V
 '[I] was really happy.' [koe11-A-02:42.95]
- b. $\frac{rs}{\text{TELL}1++}$ [V]
 '[He] was always talking [about topics he liked].' [stu13-B-11:41.95]

²⁰All examples with S V S order are declarative sentences except (13b), which is an interrogative.

A total of 41 examples (8.3%) have a subject and a verb followed by a complement, while an additional 18 examples (3.6%) display the same constituent order but with the clausal complement being under the scope of role shift. Another 12 examples (2.4%) display V S CO order, while 20 (4.0%) sentences include a verb followed by a complement, but no subject. Several other orders in constructions with clausal complements were attested, albeit with lower frequency.

Sentences with a clausal complement usually involve the verbs SAY1, SAY2, KNOW1, KNOW2, and THINK (see Section 4.3.2; two examples are provided in (15a) and (15b).

- (15) a. INDEX₁ **THINK** $\overline{\text{WHY INDEX}_1 \text{ TEACH}_a}$ ^{rs} S V [CO]
 'I thought: "Why did I teach him?'" [fra03-A-01:58.00]
- b. **KNOW2** INDEX_a INDEX₁ PU INDEX₁ SCHOOL GOOD V S CO
 'He knew I was good at school' [goe03-A-02:19.45]

Objects are not all too commonly attested. The most frequent order that includes an object is S V O (16a) with 17 counts (3.4%), followed by V O order with 11 occurrences (2.2%), and O V with five counts (16b). A total of 11 examples, all including the verb form LIVE1 and with a variety of constituent orders, include a locative argument that looks like an object (16c). Other orders, such as S O V and O \ S V, occur but in lower numbers. In fact, many of the constituent orders that occur only once or twice in the data include an object (of any type, but excluding clausal complements), adding up to 52 instances in total. Together with the 43 examples that are represented in Table 4.10, a total of 95 (19.2%) body-anchored verb constructions include an overt object.

- (16) a. INDEX_a **SEARCH-FOR** EMPLOYMENT INDEX_b S V O
 'He searched for a job there.' [fra05-B-02:03.50]
- b. DEAF PERSON++ **TALK** O V
 '[I] could talk with deaf people [there].' [koe13-A-00:28.55]
- c. INDEX₁ **LIVE1** NOW $\overline{\text{NOT CITY}}$ ^{hs} S V O/Loc
 'I don't live in the city.' [hh04-A-03:19.15]

The data indicate a preference for postverbal direct objects ('O') in body-anchored verb constructions (46 out of 80 constructions; 57.5%), although preverbal direct objects are also attested with some regularity (N=29; 36.3%). Of these 29 examples, nine (11.3%) involve a sentence-initial object followed by a prosodic

boundary, thus suggesting that these are topicalized constituents. In four examples, copies of O both precede and follow the verb, and in one example, a direct object is sandwiched in between two copies of the verb.

Rathmann (2003) argues that DGS does not have fixed constituent order, proposing that it is unnecessary because argument roles are indicated either on the verb in the case of agreeing verbs, or on the person agreement marker (PAM) in the case of plain verbs denoting transitive concepts. Rathmann (2003, p. 182) argues that such verbs are phonologically constrained such that PAM is inserted to “morphologically repair the lack of agreement” on the verb. The constraints he refers to include body-anchoring as well as motor constraints.²¹ Regarding the use of PAM, the corpus data suggest a different story: the auxiliary is hardly ever attested in the data (see Chapter 8.3.2 for a brief discussion), yet there are many clauses with body-anchored verbs that denote transitive concepts. Two such constructions are presented in (17a) and (17b). Evidently, the flexibility with respect to the ordering of the object vis-à-vis the verb cannot be explained by positing that agreement expressed on PAM licenses such free(er) word order.

- (17) a. $\frac{\text{fr}}{\text{THEN YOUNG}} \setminus \frac{\text{hs}}{\text{KNOW1}}$ O \ V
 ‘The younger one, [I] don’t know.’ [koe20-B-03:57.90]
- b. INDEX₁ **SEARCH-FOR** ALWAYS CERTAIN BOOKS S V O
 ‘I would always search for certain books.’ [mst10-B-05:40.00]

As I pointed out earlier, some sign linguists have suggested for a number of sign languages which show a preference for SVO order in clauses with plain (i.e. body-anchored) verbs that SVO may be the basic constituent order, since plain verbs are assumed to have the least morphological marking (Chen-Pichler, 2008; Fischer, 1975, 2014; Kimmelman, 2012). Based on the frequency data reported in this section, one might arrive at a similar conclusion for DGS, which would be

²¹In passing, Rathmann (2003, p. 183) mentions that “while the form of [transitive body-anchored verbs] can be used for a *first-person subject* and a *non-first object associated with the addressee*, the body contact [...] blocks the inflection for two non-first person arguments” (emphasis added). This is an intriguing comment in light of the studies by Meir et al. (2007) and Oomen (2017) discussed in Section 4.1, as it appears to suggest that such forms trigger a first-person interpretation of a subject by default. It is unclear why Rathmann (2003) proposes that transitive body-anchored verb forms mark an addressee object, and no data are presented to support this claim. It appears that such a second-person interpretation is also considered a default of sorts. I return to the relation between (null) subjects and grammatical person in Section 4.3.3.

in contradiction to previous reports that DGS has basic SOV order (Bross & Hole, 2017; Pfau & Glück, 2000; Steinbach & Herrmann, 2013). However, as will be discussed extensively in Chapter 8.2, I will claim that body-anchored verbs in DGS in fact do morphologically agree with their subjects, such that the argument above no longer applies. In Chapter 8.3.1, I put forward a different proposal regarding (basic) constituent order in DGS.

The next section discusses constituent order in dependent clauses.

4.3.1.2 Dependent clauses

Dependent clauses are indicated with a '#' preceding the constituent labels on the AS-WO tier. This category includes embedded and relative clauses, as well as adverbial clauses such as conditionals, thus forming somewhat of a mixed bag. Still, if the results show either little variation, or very similar results to those for main clauses, then there seems little incentive to break this category down into separate classes – especially giving that doing so would leave us with too few examples for each clause type to say anything meaningful about them.

The data set includes 61 dependent clauses with body-anchored verbs. Table 4.11 lists all of the constituent orders attested in these clauses. Once again, most of the attested orders occur just once in the data. Overall, the results mirror those for main clauses, although – as one might expect – clausal complements occur much less often in dependent clauses.

Table 4.11: Constituent order in dependent clauses with a body-anchored verbs (N=61). Hashtag indicates dependent clause; square brackets indicate boundaries of role shift marking; backslash indicates prosodic boundary.

Order	#	Order	#	Order	#
# [S O V]	1	# S CO V V'	1	# V V2	1
# [V S]	1	# S O V	1	# S V O	2
# [V V']	1	# S O V A	1	# S V S	2
# Aux S/O O/S V	1	# S V [O]	1	# V CO	2
# Mod S V O	1	# S V CO	1	# [S V]	4
# Mod V	1	# S V O/Loc	1	# [V]	4
# O/CO V	1	# S V O2 CO	1	# V S	5
# O/Loc V Aux-sp	1	# V S CO	1	# V	7
# O/Loc V S CO	1	# V V'	1	# S V	15
# S CO V CO	1				

As in main clauses, the most frequent order in dependent clauses is S V with

15 occurrences (24.6%), followed by V with 7 examples (11.5%). V S, [V], and [S V] order are attested five, four, and four times, respectively. Subjects are often overt; they occur in 42 (68.9%) of the dependent clauses. Their preferred position is preverbal, although the reverse order is also occasionally attested. In (18), the three most common orders in dependent clauses ([S V], V, and S V) are illustrated with examples from the corpus.

- (18) a. INDEX₁ PONDER $\overline{\text{INDEX}_1 \text{EAT}_1 \text{HOW}}$ ^{rs} # [S V]
 'I was thinking: "What should I cook?"' [hh01-A-03:12.25]
- b. $\overline{\text{BE-HUNGRY}}$ ^{re} \ INDEX_{1 pl} APPETITE HOW $\overline{\text{EAT-HAMBÜRGER PU}}$ ^{'döner'} # V
 'If we get hungry, we'd like a kebab.' [mvp01-B-05:31.55]
- c. $\overline{\text{INDEX}_3 \text{SMELL}_2}$ ^{re} \ $\overline{\text{GESTURE:HANDS-UP}}$ ^{rs} # S V
 'If they smell [alcohol], you can get arrested.' [koe05-A-07:48.25]

Objects are often not overtly present in the clause: just 12 examples (19.7%) include an object (of any type but excluding clausal complements). Given the paucity of examples, it is not possible to draw any meaningful conclusions about the preferred position of direct objects in the clause, but it seems that both preverbal and postverbal position are possible. Both Steinbach and Herrmann (2013) and Pfau and Glück (2000) have claimed that, just as in matrix clauses, DGS has basic SOV order in embedded clauses. Clearly, I do not have enough data to substantiate this claim; all I can say is that, just as in main clauses, the handful of embedded clauses that include an object illustrate a mix of (S)OV and (S)V O orders.

4.3.2 Valency patterns

In this section, I describe valency patterns in clauses with body-anchored verbs. First, a word of caution: while corpus data can reveal which constructions are possible in a language, they do not provide negative evidence. Thus, it may happen that a verb form which I describe as intransitive can also occur in transitive constructions, but that there simply was no such construction in the data set. In general, the corpus data include few examples of alternation pairs (e.g. example pairs demonstrating a causative-inchoative alternation). When they do occur, they are discussed. In some cases, I checked intuitions about possible construction types with two signers of DGS (see Chapter 2.5). Impersonal constructions, involving demoted subjects, are discussed separately in Chapter 8.3.5.

Verb forms with four or fewer tokens in the data set are excluded from analysis. They include BE-THIRSTY, DIE3, SMELL2, SAY2, EAT1, EAT3, SHAVE1, SHAVE2, and all four forms of DRESS.²²

Firstly, a fair number of body-anchored verbs are intransitive, where the subject is optionally null (see Section 4.3.3). Verbs of sensation, such as FEEL-COLD (19a) and FEEL-PAIN (19b), are exclusively attested in intransitive constructions.

- (19) a. $\overline{\text{INDEX}_2}$ **FEEL-COLD** rs, re
[S V]
 “‘You’re cold, aren’t you?’” [sh07-B-05:13.65]
- b. INDEX_1 **FEEL-PAIN** S V
 ‘I was really hurt.’ [lei09-B-06:49.10]

Other verbs exclusively used intransitively in the corpus data include verbs of non-verbal expression (SCREAM, LAUGH1, LAUGH2 (20a), and LAUGH3), the adjectival predicate BE-DEAF, the activity verbs RUN1 (20b) and RUN2, and the verb DIE2 (20c). Note that the lexical forms for DIE2 and DIE3, which only differ with respect to handshape and reference the use of a blade or knife to slit a throat, appear to suggest that these forms can be used in a causative manner (“The man killed the woman [by slitting her throat]”). However, the two DGS informants indicated that DIE2 and DIE3 cannot be used causatively. As for the forms RUN1 and RUN2, one of the informants, who preferred use of the form RUN1 over RUN2, indicated that the addition of a direct object in constructions with RUN1, as in INDEX_1 RUN2 COMPETITION, is grammatical. The same construction but with the form RUN2 is judged ungrammatical.

- (20) a. INDEX_1 **LAUGH2** S V
 ‘I had to laugh.’ [koe18-B-01:00.95]
- b. LEISURE MORE INDEX_1 **RUN1** S V
 ‘In my spare time I still go running.’ [koe11-A-03:08.60]
- c. **DIE2** BEFORE YEAR-5 V
 ‘[She] died five years ago.’ [lei02-A-04:19.55]

²²The one example with SHAVE1, however, is worth mentioning, because it represents a clear resultative construction – the only one attested in the data set. The construction is represented in (i).

(i) DEMAND \ COACH BOTH BRAIN **SHAVE1** BALD # S O V A
 ‘We demanded that our coaches both shaved their heads bald.’ [ber04-B-06:36.85]

LOOK-AT1 is another form that occurs only with a subject in the clause. As I discussed in Chapter 3.5.6, this form appears to be a hybrid which allows modification such that the index and middle finger are directed toward a locus in space. This particularity could lead one to suggest that LOOK-AT1 is a regular transitive verb. However, I suggest there is a reason the object never surfaces as an argument: LOOK-AT1 does not take a real object. Rather, it appears that LOOK-AT1 has acquired the grammatical function of introducing a role shift in a separate clause, as in the examples in (21).²³ The meaning of the sign does not need to be literal – in fact, it often is not – but it tends to refer to mental rather than physical perception. Indeed, the directionality of the form appears to be random in various instances in the corpus data. More research is necessary to establish what the exact grammatical status of LOOK-AT1 is, but the form clearly has a host of interesting properties.

- (21) a. INDEX₁ $\frac{\text{rs}}{\text{LOOK-AT1}_a} \setminus \frac{\text{rs}}{\text{YES SERIOUS INDEX}_1 \text{ PU}}$ S [V] \ [V]
 'I realized it was serious.' [hh03b-A-02:40.40]
- b. $\frac{\text{rs}}{\text{LOOK-AT1}_a} \setminus \frac{\text{rs}}{\text{MATCH INDEX}_1 \text{ INDEX}_a}$ [V] \ [V S/O O/S]
 'I instantly knew that it would suit me.' [mst10-A-13:10.15]

Other body-anchored verbs can (also) be used transitively. Some examples are the action verbs DRINK, EAT2, HUG2 and SEARCH-FOR, and the perception verbs HEAR1 and HEAR2. DRINK and EAT2 seem to be able to participate in the unspecified-object alternation, in which the verb “is understood to have as object something that qualifies as a typical object of the verb” (Levin, 1993, p. 33). In other words, the object is a general term, such as food or drink. The examples in (22) illustrate this alternation.²⁴

- (22) a. DRINK BEER OR CHAMPAGNE V O
 '[We] drank beer or champagne.' [koe13-A-05:02.65]
- b. THEN LAST DRINK ALLOWED PU V Mod
 'Then [we] were allowed to drink.' [fra01a-B-02:07.70]

²³LOOK-AT1 in DGS appears to have the same function as the formationally identical sign in ASL as described by Winston (2013) and Healy (2015). Winston (2013, p. 63) notes that LOOK-AT in ASL can be analyzed as an “overt marker of agentivity”, while Healy (2015, p. 148) claims that the sign, which she calls a ‘prospective attending sign’, functions to “anticipate the experiencer’s affective response”.

²⁴It depends on one’s theoretical assumptions whether one would assume the object is part of the lexical or syntactic representation of the verb.

Some verbs of emotion can also occur in transitive constructions. **LIKE** and **DISLIKE** are examples of consistently transitive verbs. Example (23a) is a sentence in which both arguments are overt, but subject and object can also be dropped: (23b) includes only a subject, (23c) includes only an object, and (23d) does not include either argument. However, in each case, the dropped argument(s) can be recovered from the context.

- (23) a. INDEX₁ **LIKE** SPORT INDEX_a S V O
 'I like sports.' [goe01-A-00:01.00]
- b. $\frac{hs}{\text{INDEX}_a}$ **LIKE** NOT PU S V
 'He does not like [being surrounded by hearing people].'
 [ber04-A-11:32.40]
- c. **LIKE** TEAM TOGETHER V O
 '[I] like team sports better.' [koe11-A-01:00.30]
- d. $\frac{hs}{\text{LIKE}}$ NOT V
 '[I] don't like [the potatoes too dry].' [hh01-A-06:27.25]

Other verbs of emotion are also attested in transitive constructions, but are more frequently used intransitively. While clauses with **LIKE** include an overt object in 25 out of 30 cases, for instance, constructions with **BE-HAPPY** include an object in just 8 out of 20 cases. Moreover, most of these objects are clausal complements, such as in (24a). Indeed, although in some cases, the immediate context is explicit about the source of happiness (24b), in other cases, no cause or stimulus is mentioned in the context, suggesting that it is not deemed relevant (24c). The forms **BE-SAD1**, **BE-SAD2**, **BE-SAD3**, and **FEAR** behave in a similar way to **BE-HAPPY**.

- (24) a. INDEX₁ **BE-HAPPY** PARENTS BIRTH GERMAN S V CO
 'I'm glad my parents were born in Germany.' [mst12-A-03:42.40]
- b. $\frac{re}{\text{LEAVE}}$ \ **BE-HAPPY** # V
 'When [the teacher] left, we were happy [about it].'
 [fra05-B-10:26.25]
- c. PU **BE-HAPPY+++** V
 '[We] were all very happy.' [koe17b-B-03:29.35]

The results are reminiscent of what I reported for psych-verbs in NGT (Oomen, 2017). Semantically, and likely also syntactically, objects in clauses with the NGT

an argument. The two DGS informants confirmed that such ditransitive constructions are marked; preferring constructions that add a verb such as GIVE to yield the phrase GIVE NAME instead.

- (27) a. $\overline{\text{DEAF}}$ PARTY $\overline{\text{NAME}}$ $\overline{\text{DEAF}}$ PARTY S V O
 'A deaf party would be named Party of the Deaf.' [goe05-A-07:51.95]
- b. **NAME** INDEX_a DEVELOP HELP V S O
 'It's called foreign aid.' [goe05-A-11:43.65]

Finally, the verbs ASK-FOR, SAY1, TALK, and TELL1 – all verbs of saying – may occur in ditransitive constructions. In example (28a), a first-person pointing sign with an added arc movement – glossed in the corpus as a dative form – functions as the indirect object. The content of what is said is represented in the clausal complement. In example (28b) with TELL1, 'my mother' is the teller, 'me' is the addressed referent, and the complement clause represents what is being told.

- (28) a. INDEX_a INDEX₁ **SAY1** \ $\overline{\text{COOK ACCOMPLISH}}^{\text{qrs}}$ S O2 V [CO]
 'He asked me if I could manage with the cooking.' [hh01-B-00:42.70]
- b. POSS₁ MOTHER_a INDEX₁ **TELL1** INDEX_a \ BACK-THEN IN DORTMUND
 INDEX_b HAPPENED INDEX_b S O2 V \ CO
 'My mom told me that the school was in Dortmund.'
 [mst16-A-03:09.45]

In conclusion, intransitive, transitive, as well as ditransitive constructions with body-anchored verbs are all attested. Given that body-anchored verbs do not have the ability to agree with objects, one might have expected such verbs to rarely surface in (di)transitive constructions. It is evident from the discussion above that this is not the case. Indeed, similar findings have been reported for RSL (Kimmelman, 2018a).

4.3.3 Subject-drop patterns

In this section, the conditions under which subject drop is licensed are investigated. Following previous work on psych-verb constructions in NGT (Oomen, 2017), it is hypothesized that, due to an iconic association between first person and the body, subjects can only be null when they are first person.

Recall from Chapter 2.3.5 that annotations were made with information about the subject referent for each example in the data set. Specifically, it was indicated for each clause whether (a) the subject referent is first, second or third person; (b) the subject referent is plural; (c) the subject is overt or null, and (d) there is action role shift in the clause.²⁶ Singular and plural subjects with the same person are collapsed in the analysis, as there are very few plural subjects and it is not expected that this parameter affects the results. Table 4.12 tabulates the results. I focus on the contrast between first- and third-person subjects first; second-person subjects are discussed separately for reasons to be explained later in this section.²⁷

Table 4.12: (a) Overt and (b) null subjects in clauses with body-anchored verbs (N=556) in DGS; rs = role shift.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	175	36	First	105	14
Second	36	0	Second	8	2
Third	135	17	Third	10	17

Unremarkably, overt first- and third-person subjects freely occur in clauses both with and without role shift. However, the results show a different pattern for non-overt subjects. While null first-person subjects occur frequently (N=105), non-overt third-person subjects are indeed very rare. There are just 10 cases, whereas there are 135 examples in which the third-person subject is overt.²⁸ When there is role shift, third-person subjects are more frequently null (N=17), especially considering that clauses with role shift (N=86) are attested much less

²⁶Quotative role shift is indicated in the annotations with the label ‘qrs’. Examples with quotative role shift are grouped together with the clauses without role shift, as the prediction is that only action role shift allows the drop of a non-first person argument.

²⁷Note that the numbers reported in Table 4.12 slightly differ from those reported in Oomen and Kimmelman (2019), even though the analyses in this dissertation and that paper are based on the same data set of body-anchored constructions. For instance, the total number of constructions with an overt first-person subject is reported as 175 here, but it is 174 in Oomen and Kimmelman (2019). The cause of these slight divergences is that I conducted another annotation round after the publication of Oomen and Kimmelman (2019) to clean up some errors and inconsistencies in the annotations. The changes do not have any significant impact on the overall results.

²⁸See Chapter 7.6 for a statistical analysis of subject drop in clauses with body-anchored, neutral, and agreeing verbs.

frequently overall than clauses without (N=469). By means of role shift, the signer comes to represent the thoughts or actions of a referent, such that there is a first-person interpretation of the subject within the context of a role shift. As such, examples with role shift and a null third-person referent (in the global context) do not contradict the hypothesis.

Although non-overt third-person subjects are rare in sentences with body-anchored verbs, they are still attested in a handful of cases. These exceptions to the hypothesis warrant an explanation. Several different factors seem to be at play. Firstly, a couple of examples which received an annotation for a third-person non-overt subject might actually be better interpreted as impersonal constructions. For instance, the non-overt subject in (29a) could refer to the adult deaf individuals who were mentioned several sentences previously, but the example may just as well be an impersonal statement with a non-referential subject. Secondly, in some examples, it is not clear from the context whether the non-overt subject is first or third person. In (29b), the corpus translation implies a third-person subject and the context allows for either interpretation. Indeed, the clause includes a first-person pointing sign following the verb, and, despite its position in the clause, it would be difficult to interpret this sign as an object rather than a subject. Thirdly, in some examples, closer inspection reveals that a pointing sign might actually be present (i.e. the subject is overt), but its articulation is so rapid that it is difficult to observe (29c); see the video still in Figure 4.13.

- (29) a. FEEL NEED **HEAR1**
 ‘They [adult deaf individuals fully integrated into the deaf community/some people] still feel like they need to hear.’ [hb03-A-04:00.00]
- b. FOR PROMISE INDEX₁ \ **BE-SAD3** INDEX₁
 ‘I did it for my son. *He/I* would have been sad otherwise.’
 [ber12b-A-18:35.65]
- c. (INDEX_a) **BE-HAPPY WITH**
 ‘They are happy I can play with them.’ [goe01-A-01:40.00]

I thus conclude that there is enough evidence to support the prediction that non-overt third-person subjects in clauses with body-anchored verbs are ruled out. Let me now turn to the cases with second-person subjects in our data. It is predicted that such subjects should pattern like third-person subjects, as the hypothesis formulated in Oomen (2017) dictates that only first-person subjects can



Figure 4.13: A video still showing the articulation of the index sign indicated in (29c).

be dropped in clauses with body-anchored verbs.²⁹

The results in Table 4.12 show that the vast majority of second-person subjects in clauses without role shift (36 out of 44 cases) are overt. Still, there are eight counterexamples that include a dropped second-person subject.³⁰ These exceptions are in fact quite easy to explain. Six of the examples (four of them with the verbs KNOW1 or KNOW2) are questions to the addressee, and they are clearly non-manually marked as such (30). It thus appears that the default interpretation of null subjects in direct questions is always second person.

- (30) $\frac{\text{re}}{\text{KNOW2 COFFEE FILTER}}$
 'You know, a coffee filter.' [hh01-A-05:09.90]

Interestingly, the remaining two exceptions are strikingly similar in a couple of respects: both involve quotative role shift, and in both cases, the signer is quoting a hearing, non-signing, person. It appears that both examples involve the signers mimicking 'foreigner talk' (Ferguson, 1971, 1981; Hatch, Shapira, & Gough, 1978). The three clauses in (31), for instance, where the middle sentence lacks an overt second-person pronoun, all convey the same meaning and additionally have a simplified structure. Although foreigner talk is not typically characterized by subject drop (Ferguson, 1981; Hatch et al., 1978), it is possible that the repetition in the example licenses such drop. Alternatively, the characteristics of 'foreigner

²⁹Recall, however, that there were no cases with second person subjects in the NGT data reported on in Oomen (2017).

³⁰Also note that second-person subjects almost never occur with role shift: for pragmatic reasons, signers are unlikely to take on the role of the addressee.

talk' might differ in settings with hearing non-signers speaking to deaf persons. As far as I know, no research has been carried out on this subject.³¹

- (31) $\frac{\text{INDEX}_2 \text{ HARD-OF-HEARING}}{\text{qrs}} \setminus \frac{\text{CAN HEAR1}}{\text{qrs}} \setminus \frac{\text{INDEX}_2 \text{ BAD HEAR1}}{\text{qrs}}$
 “You’re hard-of hearing, you can’t hear, you can’t hear very well!”
 [goe03-A-02:13.30]

In any case, the eight examples with null second-person subjects can thus all be accounted for by one of the two observations offered above; Chapter 8.2.1.7 offers further discussion of second-person subject drop with body-anchored verbs.

In summary, I predicted that body-anchored verbs should disallow null non-first person subjects in the absence of role shift. The corpus data provide strong support for this prediction. A small number of counterexamples were attested, most of which can be explained by other factors. Chapter 8.2 presents a formal account of constructions in which the subject-drop patterns in clauses with verbs of different types play a central role.

4.4 Summary

In this chapter, I described the formational and morphosyntactic properties of body-anchored verbs. I showed that verbs of this type tend to preserve the body as a meaningful part of the sign – in line with Meir et al. (2007) and Oomen (2017) – while the hands can iconically represent a variety of different aspects of events and their participants. Depending on which such aspects are reflected in a form, the body may take on different roles, e.g. that of an agent or experiencer. I proposed a typology that classifies body-anchored verb forms into categories on a continuum that orders them from those that maximize the involvement of the external environment while minimizing the (agentive) role of the body to those that expressly focus on body-internal experience. I also showed that this continuum maps rather nicely onto the categories of the semantic map introduced in Chapter 3. That is, there is some support for the notion that the properties that are iconically highlighted in body-anchored verbs are precisely those that mediate transitivity marking in spoken languages.

³¹However, research on the use of gestures in foreigner talk has shown – perhaps unsurprisingly – that deictic pointing signs are very common in foreigner talk (Adams, 1998), which might be a reason to expect pointing to be ubiquitous in hearing-to-deaf talk, too. Viewed from this perspective, the construction in (31) would be somewhat unexpected.

Furthermore, I analyzed constituent orders in clauses with body-anchored verbs in the corpus data. The results show that the subject tends to come before the verb and the (direct) object, if present. The direct object can occur both before and after the verb, although postverbal position is preferred. I also discussed valency patterns in clauses with body-anchored verbs. The corpus data show that some such verbs are exclusively intransitive, others are (di)transitive, and yet others may be used both intransitively and transitively. Thus, despite the fact that body-anchored verbs cannot express object agreement, many of them *do* express transitive concepts. Finally, I showed that clauses with body-anchored verbs resist null non-first person subjects, while null first-person subjects occur often. Following Oomen (2017), I suggest that these results indicate that body-anchoring leads to an automatic association with first person. This notion forms the basis for proposing that body-anchored verbs are default first-person forms that are in an agreement relation with their subject – such that the verb determines interpretation in the absence of an overt subject. I propose a formal mechanism for this proposal in Chapter 8.2.

CHAPTER 5

Neutral verbs

IN this chapter, I provide a detailed description of the class of verbs I call ‘neutral verbs’, after their default place of articulation in neutral space in front of the signer. As such, I distinguish them from body-anchored verbs, whose properties I have discussed extensively in Chapter 4, even though verbs of both types have traditionally been categorized as plain verbs.

Previous literature on neutral verbs – albeit under different names – in various sign languages is discussed in Section 5.1. Particular attention is paid to perspectives on the localizing abilities of neutral verbs. Section 5.2 provides a description of iconic mapping patterns in neutral forms. I show that four main iconic lexicalization strategies are attested in the corpus data. Section 5.3 focuses on morphosyntactic properties: constituent order, valency, localization properties, and subject-drop patterns are discussed in turn. Section 5.4 summarizes the chapter.

The current chapter is structured comparably to the previous chapter on body-anchored verbs as well as the following chapter on agreeing verbs. This facilitates a comparison between verbs of the three types in Chapter 7 to establish whether the proposed three-way distinction is justified on morphosyntactic grounds.¹

5.1 Background

Insofar as researchers have treated neutral verbs as a distinct verb class, the main reason for doing so has been the observation that these verbs have the potential to be localized in the signing space. While some linguists have argued for analyzing such spatial modification as a form of agreement, others have argued against it. I discuss works that represent both views on the matter in Section 5.1.1 and 5.1.2, starting with studies that posit that localization is *not* agreement.

5.1.1 Localization is not agreement

Based on data from American Sign Language (ASL), Padden (1988, 1990) acknowledges that verb forms articulated in neutral space can be spatially modified such that their place of articulation aligns with that of an argument. However, she argues that this type of modification should be treated differently from that attested in double-argument agreement verbs, which she considers to be an agreement

¹Recall from Chapter 3 that I have already demonstrated that the different verb types have distinct semantic profiles.

mechanism. According to Padden (1988), the exponent of neutral verb localization is a pronoun clitic. An important argument she offers against an agreement analysis and in favor of a clitic analysis is that there is variability – and sometimes even ambiguity – with respect to whether localization occurs at the locus of the subject or at the locus of the object, as illustrated in (1) (Padden, 1990, p. 121). There are two readings for the example in (1): one where the two instances of the verb WANT agree with their respective subjects (WOMAN; MAN), and one where the verbs agree with their respective objects (unspecified in the example).

- (1) WOMAN WANT_a \ MAN WANT_b [ASL]
 a. ‘The woman_i is wanting and the man_j is wanting, too.’
 b. ‘The woman wants it_i and the man wants it_j.’

Padden additionally notes that the iteration of signs at different locations, as in (1), is a mechanism that is not restricted to verbs, since nominal and adjectival signs can undergo similar iteration (2) (Padden, 1990, p. 122). Moreover, she points out that the verbs in (1) and the nouns in (2) can also be used in non-localized, non-iterated, form while being accompanied by overt pronominal pointing signs simultaneously articulated by the weak hand. In other words, pronouns can be independently articulated by the weak hand, but if they are not, they may cliticize onto (iterations of) the neutral verb in the form of localization. Although agreement verbs can also be accompanied by pronominal points, Padden (1990) claims that (a) they must necessarily be inflected, and (b) the resulting sentence is never ambiguous – unlike the sentence in (1). Based on these observations, Padden argues for a clitic account over an agreement analysis.²

- (2) INDEX₁ SEE DOG_a DOG_b DOG_c [ASL]
 ‘I saw a dog here, there and there, too.’

Much like Padden for ASL, Keller (1998) argues that verb localization in German Sign Language (DGS) is best analyzed in terms of pronominal affixation. Unlike Padden, however, Keller claims that the modification of agreeing verbs is also an affixation process. Motivation he offers for this approach is that agreeing verbs do not mark agreement with grammatical roles, but ‘agree’ with locations associated with particular thematic roles, namely Source and Goal.³ The only verbs

²Others, however, have argued against such an approach; see Section 5.1.2 for more details.

³Meir (1998), in fact, makes similar observations for ISL but draws entirely different conclusions from them; see Chapter 6.1.2.2 for details.

that do not have pronominal affixes according to Keller are verbs that have a lexically specified place of articulation that phonologically constrains affixation. In practice, these are usually body-anchored verb forms.

5.1.2 Localization is agreement

Scholars who have suggested, in more or in less explicit terms, that localization should be considered a part of the agreement system in sign languages include Fischer and Gough (1978) on ASL, Bos (1993) and Van Gijn and Zwitserlood (2006) on Sign Language of the Netherlands (NGT), Meir (1998) on Israeli Sign Language (ISL), Costello (2015) on Spanish Sign Language (LSE), and Lourenço (2018) and Lourenço and Wilbur (2018) on Brazilian Sign Language (Libras).

Fischer and Gough (1978) were among the first to observe that some verbs may be localized to align with a locus assigned to a referent, noting that in ASL, “[one way] a verb sign may show its grammatical relations is in displacement of the *dez* [handshape], as what acts, to the proximity of the location of one of its arguments” (Fischer & Gough, 1978, p. 30).

Investigating NGT, both Bos (1993) and Van Gijn and Zwitserlood (2006) explicitly characterize the localization of verbs such as transitive *FIND*, which may localize at the object locus, or intransitive *WAIT* as agreement. Van Gijn and Zwitserlood (2006) argue that sign languages in general, and NGT in particular, have two types of relevant ϕ -features, namely locus (instead of person) and gender features. Correspondingly, there are two types of agreement, i.e. locus agreement and gender agreement. Locus agreement is expressed either through directionality in the case of agreeing verbs or localization in the case of neutral verbs, while gender agreement is realized by particular hand-configurations and marks the Theme argument of verbs of motion, location or existence, such as *GIVE*.

Costello (2015), Lourenço (2018), Lourenço and Wilbur (2018), and Meir (1998) all explicitly address arguments for and against an agreement analysis of localization, each eventually concluding that an agreement approach is on the right track. Meir (1998) observes that in ISL, localization of neutral verbs tends to occur at the locus associated with the internal argument of the sentence, as illustrated in (3) (Meir, 1998, p. 94).

- (3) a. BOY INDEX_a GROW-UP_a [ISL]
 ‘The boy grew up.’

- b. POLICEMAN INDEX_a THIEF INDEX_b CATCH_b [ISL]
 ‘The policeman caught the thief.’

Building on work by Engberg-Pedersen (1993), Meir (1998) then goes on to argue that the ambiguity Padden (1990) reports for sentences such as (1) arises because they conflate two distinct phenomena.⁴ If the sentence in example (1) receives the interpretation in (1a) (‘The woman_i is wanting and the man_j is wanting, too’), Meir suggests that the construction exemplifies discourse agreement rather than syntactic agreement. Such discourse agreement is suggested to mark a comparison or contrast, in which referents are localized in contrastive locations to highlight the contrast between them. Often, the partitioning is marked overtly by a torso tilt or body shift. While Meir’s analysis is based on ISL, she claims that it is likely ASL works in the same way, since many other relevant properties of the agreement system are shared between the two languages.

Conversely, the interpretation in (1b) (‘The woman wants it_i and the man wants it_j’) is analyzed as a sentence-level phenomenon involving agreement with the internal argument of the verb, although Meir (1998) refrains from treating this type of agreement on a par with prototypical double-argument agreement. The reason for her reservations is her claim that the latter kind represents (thematic) Source-Goal agreement, while the former marks a (syntactic) internal argument.

Costello (2015), taking note of Meir’s discussion, shows that localizable verbs in LSE have similar properties to those in ISL, also observing a difference between pragmatic and morphosyntactic agreement in LSE. Furthermore, he provides several arguments against Padden’s (1988) pronominal clitic analysis and in favor of an agreement analysis. For instance, he shows that localized verbs in LSE can co-occur with co-referential elements. In (4), for example, the noun TORTOISE and the verb LAUGH-AT are articulated at the same locus (Costello, 2015, p. 233). This would be unexpected under a clitic analysis, since clitics and co-referential elements are frequently (although not always) in complementary distribution with each other (Kayne, 1975).

⁴To be more specific, Engberg-Pedersen (1993) argues for Danish Sign Language that modifiable plain verbs (i.e. neutral verbs) allow pragmatic agreement, where the semantic relation between the agreeing verb and the relevant argument “must be interpreted from syntactic, lexical-semantic, or discourse features” (Engberg-Pedersen, 1993, p. 155). Agreement verbs, she argues, may additionally show semantic (Agent-Patient) agreement. Meir’s analysis is both a sophistication and an extension of this account.

- (4) HARE LAUGH-AT_a TORTOISE_a [LSE]
 ‘The hare would laugh at the tortoise.’

In addition, Costello (2015) points out that clitics are not unique in their ability to appear on different word types; agreement affixes may do so, too. In other words, the fact that nouns or adjectives can be localized in addition to verbs does not necessarily force the conclusion that localization should be analyzed as a clitic. A final argument against a clitic analysis is that the only phonological characteristic that localized verbs and pronominal signs share is the specification for location.

Costello (2015, p. 234) concludes that “[...] most of the properties of the spatial marking of verbs in LSE coincide with those described for agreement markers cross-linguistically, and not with those that characterize some sort of (incorporated or clitized) pronominal affix”. As such, he claims that localizable verbs and agreement verbs both express spatial agreement.

Formally, Costello proposes that neutral verbs are situated in the head of the vP and carry an unvalued ‘identity’ feature, which is somewhat like a person feature. This feature probes within its domain for a suitable goal, establishing agreement with the internal argument carrying a valued identity feature. In Costello’s account, regular agreeing verbs make use of a similar mechanism to agree with their objects. For subjects, Costello proposes that the T head, once merged, serves as a probe to instantiate agreement with the subject. The verb then moves to T to ensure the correct phonological form is generated at Spell-Out.

Lourenço (2018) and Lourenço and Wilbur (2018) are perhaps the most explicit advocates of an analysis that treats neutral and agreeing verbs in (equal) terms of agreement. The authors define verb agreement in Libras, and in other sign languages by extension, as follows: “[a] verb shows agreement with its argument(s) when the location of the verb is changed in order to match the location of the argument(s), a process called co-localization.” (Lourenço & Wilbur, 2018, p. 73). To illustrate the prevalence of co-localization, the authors analyzed 584 verbs in Libras and show that 419 of them can be co-localized. Of the remaining 165 forms, 162 are body-anchored. Because of their fixed articulation on the body, Lourenço and Wilbur claim that these forms are phonologically restricted such that they cannot express agreement.⁵ Only three forms are not body-anchored

⁵In this respect, the account shows some parallels with Keller’s (1998), discussed in the previous section, who also claims that body-anchored verbs impose a phonological restriction preventing modification of their form.

yet resist localization: MAKE-EFFORT, BEG, and MEDITATE. However, Lourenço and Wilbur (2018) note that each of these forms is still articulated close to the body and is highly iconic in nature.⁶ They thus conclude that all verbs, except those with a phonological restriction, can express agreement. The upshot of their proposal is that agreement in sign languages is no longer restricted to a small set of verbs but applies to the majority of verb forms in sign languages.

To sum up, several researchers, investigating a variety of sign languages, have explicitly argued that localization is a form of agreement. While some maintain a distinction between localization and directionality (Meir, 1998), others treat localizable verbs on a par with double-argument agreement verbs (Costello, 2015; Lourenço, 2018; Lourenço & Wilbur, 2018). In Chapter 8.2, I lay out my own view as to how (the localizing properties of) neutral verbs in DGS need to be analyzed from a formal perspective. The description of the localization properties of neutral verbs in the DGS corpus data set, which will follow in Section 5.3.3, forms the basis for the analysis.

5.2 Neutral verb forms

In this section, I identify form-to-meaning mapping patterns that recur across neutral verb forms. As I showed in Chapter 4.2, almost all body-anchored verbs have in common that their place of articulation on the body is iconically motivated. Neutral verbs share the property that they are articulated in neutral space in front of the signer in their citation form. This location does not in itself appear to be iconically motivated. However, specifications for the phonological parameters of handshape and movement – which I will show in this section to be iconically motivated in many neutral verb forms – may lead to the place of articulation of the sign becoming semantically meaningful. This situation is similar to how, in body-anchored verbs, particular constellations of iconic phonological specifications lead to the body of the signer being mapped onto a particular kind of referent.

In Section 5.2.1, I propose four categories of neutral verbs based on their

⁶In fact, I would classify these forms as body-anchored because all three involve a hands-to-hands mapping (Category IV body-anchored forms; see Chapter 4.2.2). Lourenço (2018), however, defines body-anchored forms as having a [location]-specification in Brentari's Prosodic Model (Brentari, 1998), leading them to exclude these three verb forms from the body-anchored category.

iconic properties. I present a detailed description of the verb forms in these categories in Section 5.2.2. In Section 5.2.3, I return to the semantic map from Chapter 3 to observe how verb forms in the different categories cluster on the map. Section 5.2.4 presents an interim summary.

5.2.1 A categorization of neutral verb forms

Figure 5.1 presents three examples of neutral verb forms which each illustrate a different iconicity pattern. *COOK2* (Figure 5.1a) is an example of a verb that makes reference to the handling of a ladle or other type of kitchen utensil. Since the signer's hand iconically maps onto a hand, one might object that *COOK2* should be classified as a body-anchored verb; I return to this matter in Section 5.2.2. The form *SIT* (Figure 5.1b) employs handshapes that represent body parts, namely two bent knees.⁷ *HIDE* (Figure 5.1c) also has iconic components, although handshape does not appear to be iconically motivated. The movement relative to the non-dominant hand is iconic: it is a representation of the act of moving behind a solid upright object (e.g. a wall).

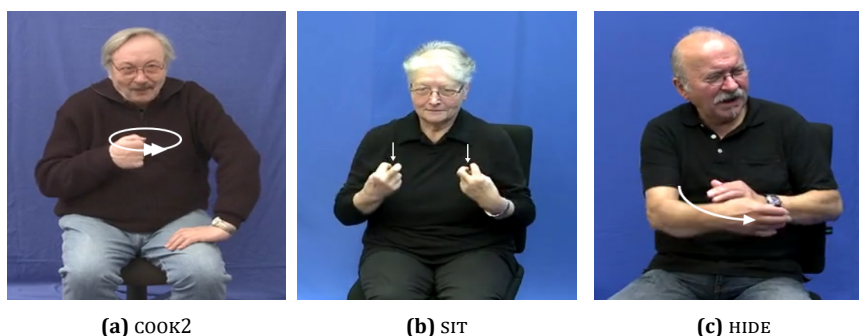


Figure 5.1: Three examples of neutral verb forms in DGS involving different iconic form-to-meaning patterns.

What, if anything, does the place of articulation in front of the signer signify? In the case of *COOK2*, it may be said to be associated with the substance that is being cooked, while the handshape and movement of the form represent the person

⁷This mapping has been verified with two DGS informants. However, another DGS informant suggested that the fingertips of the index and middle finger represent two eyes. Not much hinges on this: in either case, the form involves handshapes representing body parts.

doing the cooking.⁸ In the cases of *SIT* and *HIDE*, on the other hand, the place of articulation seems to represent (the location of) the entities doing the sitting and hiding, respectively.⁹ All other iconically motivated properties make reference to the same referent.

The description above might bring to mind the generalization described for *ISL* (Meir, 1998) and *LSE* (Costello, 2015) that the locus of the neutral verb is always associated with the internal argument, which is realized as a direct object with verbs like *COOK2* and as a subject with verbs like *SIT* or *HIDE*. The iconic properties of the three *DGS* verbs above suggest a similar pattern. However, it is important to highlight that I have merely looked at the articulatory properties of (unmodified) forms. It remains to be seen whether (i) valency patterns and (ii) localization properties bear evidence for this generalization in *DGS*. These aspects are considered in Sections 5.3.2 and 5.3.3, respectively.

There are a couple of other recurring iconicity patterns found in neutral verb forms. Table 5.1 presents the full categorization I propose. As a general note, it might be possible to argue for some verb forms that they should be recategorized into one of the other categories depending on how apparent iconically motivated aspects of their phonological form are interpreted. However, nothing much hinges on this, as the intention is not to present a definitive categorization of the form-to-meaning correspondences of individual verb forms. My primary interest is to extract and describe recurring iconic mapping patterns from the data set in order to obtain a general picture of the kind of properties that may be commonly iconically represented in neutral verb forms.

The ordering of the categories in Table 5.1 does not reflect a clear continuum, unlike the categorization of body-anchored verbs in Chapter 4. However, it is possible to differentiate between two main groups of iconically motivated neutral verbs, each consisting of two categories. In some forms (categories I and II), the hands make reference to properties associated with one referent (*ref-A*), while the place of articulation can be associated with another referent (*ref-B*). In other forms (categories III and IV), both handshape and location represent aspects of

⁸Actually, the virtual location of the stuff being cooked would lie lower than the place of articulation of the verb, but the two points are still on the same vertical plane.

⁹In the case of *SIT*, another theoretical possibility is that the place of articulation represents the location of, say, a chair. Still, the location of the sitter would necessarily coincide with that location. This situation is different for verbs like *COOK2*, since the referent doing the cooking does not necessarily need to correspond to the location of the substance that is being cooked.

one and the same referent. All categories are discussed in more detail in the next section.

Table 5.1: A categorization of neutral verb forms (N=31) in DGS based on iconic mapping patterns.

Cat. #	Neutral space	Hand(s)	#
I	hand(s) = <i>ref-A</i> ; loc = <i>ref-B</i>	instrument	5
II		hand(s): holding	10
IIIa	hand(s)+ loc = <i>ref-A</i>	whole entity - nature	6
IIIb		whole entity / body part	4
VI		iconic movement	6

5.2.2 Iconic mapping patterns

In the classification of neutral verb forms presented in the previous section, four categories are distinguished. In a nutshell, the hands represent an instrument in forms of category I, while in forms of category II, the hands map onto hands handling an object. With both types of verb forms, implicit reference is made to a referent being affected by the action represented by the signer's hands. Category III forms involve handshapes representing whole entities and can be subdivided into forms making reference to natural phenomena (IIIa) and forms making reference to human entities (IIIb). Category IV forms make reference to a single referent as well, but they involve more abstract handshapes. The movement specifications of forms in this category remain iconically motivated.

5.2.2.1 Category I

All neutral verb forms of category I are listed in (5). For each of these forms holds that the hand(s) represent an instrument.

- (5) **Category I** | instrument
BOIL, BUILD1, BUILD2, GRIND, POUR

Figure 5.2 depicts three category I neutral verbs. It should be noted from the outset that not all of the verbs included in this category unmistakably involve instrument handshapes, especially when the forms are compared to the body-anchored verbs that have instrument handshapes (Chapter 4.2.2.2). In general, it

can be observed that neutral verb forms involve more abstract representations of aspects of events – albeit still iconic in some way – than body-anchored verbs.

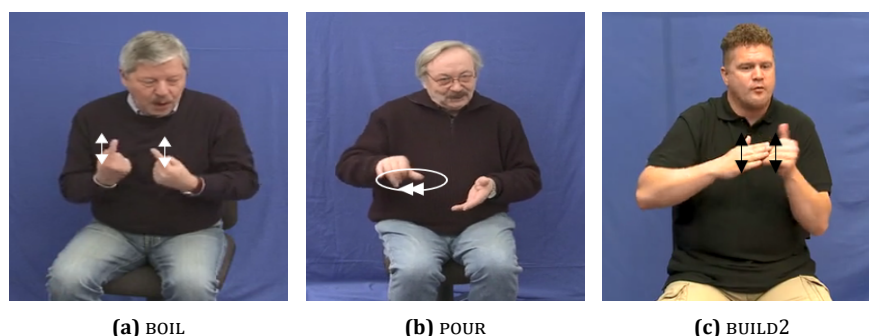


Figure 5.2: Three category I neutral verb forms, in which the hand(s) represent an instrument.

In *BOIL* in Figure 5.2a, the extended index fingers that move up and down appear to reference boiling water. The verb can be used in constructions that include an object specifying the sort of food being cooked, such as pasta (see Section 5.3.2). As such, the boiling water can be considered as an instrument effecting the change of a substance into the state of being boiled, although it may also be the water itself which may be boiled.¹⁰ The handshape used in the form *POUR* (Figure 5.2b) represents the neck of a bottle or flask from which a substance gets poured and as such can also be construed as an instrument of some sort. *GRIND* is signed with two touching F -hands making opposite circular movements, representing two objects touching to create friction and thus grind whatever material is placed in between.¹¹ Finally, the forms *BUILD1* and *BUILD2* (Figure 5.2c) make reference to building by means of hammering or piling (*BUILD1*), or stacking or layering building materials (*BUILD2*). Since the handshapes that are used in these forms are quite unmarked (*BUILD1* is articulated with F -hands), it is difficult to establish whether the hands represent instruments, objects used as building material,

¹⁰Admittedly, classifying boiling water as an instrument requires a fairly liberal interpretation of the concept ‘instrument’. I am open to the possibility that *BOIL* may be better classified elsewhere, perhaps even in a category that does not form part of the classification I propose. Again, the ultimate goal here is not to conclusively classify individual verb forms but rather to get an impression of what kind of iconically-motivated mapping strategies are available for neutral verbs as a class.

¹¹The hands might also be interpreted as hands holding objects used for grinding, in which case *GRIND* would be classified as a verb of category II.

or (human) hands. This state-of-affairs again illustrates that, even though one gets the sense that there is *something* iconic about the handshape used in a verb like BUILD2, it is not always easy to determine what the underlying iconic roots are, i.e. the forms are not necessarily transparent. Contrast this with body-anchored verb forms, which as a class appear to display overall clearer iconic mappings. For now, I tentatively conclude that BUILD1 and BUILD2 are category I forms. Were more neutral verb forms to be analyzed, the categorization of neutral verbs based on iconic form-to-meaning mappings would probably be further refined.

Table 5.2 presents the iconic mapping schema for verb forms of category I. The forms involve whole-entity handshapes representing instruments, thus exemplifying the substitutive image-producing technique (König et al., 2008). The presence of an instrument suggests the involvement of an agentive referent, referred to as *ref-A* in Table 5.2. Because of the use of a whole-entity handshape representing an instrument, the verb's movement specification gets iconically interpreted as representing the way the instrument manipulates another entity, and the location of the verb becomes associated with the entity undergoing the manipulation (*ref-B*).¹²

Table 5.2: Iconic mapping for category I neutral verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : whole entity	Instrument (<i>ref-A</i>)
<i>Movement</i> : various	Instrument (<i>ref-A</i>) affects entity (<i>ref-B</i>)
<i>Location</i> : signing space	Locus of an undergoer-like entity (<i>ref-B</i>)

5.2.2.2 Category II

Neutral verb forms of category II are similar to category I forms with the exception that they involve the hands representing hands rather than instruments. (6) lists all verbs of this type; Figure 5.3 illustrates three category-II forms.

(6) **Category II** | hands: holding

BE-DRY1, BE-DRY3, BE-WET, BREAK, COOK1, COOK2, PLAY2, STEAL1, STEAL2, WASH

¹²POUR is a somewhat conspicuous case. However, if the undergoer of 'pour' is the liquid undergoing the pouring, then the verb's place of articulation can be said to correspond to the place where the liquid is being poured.

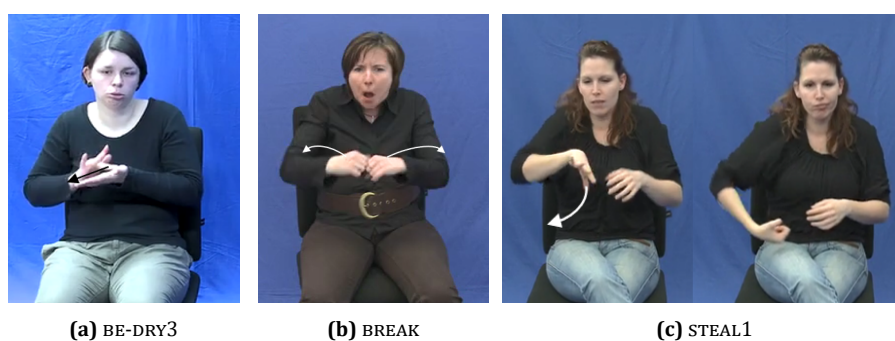


Figure 5.3: Three category II neutral verb forms, in which the hand(s) represent hand(s) holding an entity.

The form BE-DRY3 (Figure 5.3a) depicts a finger running across a surface to evaluate its aridity. The form BREAK (Figure 5.3b) represents hands holding an elongated object.¹³ The forms COOK1 and COOK2 (previously depicted in Figure 5.1a) reflect the handling of a ladle or whisk to stir food in a pan, while STEAL1 (Figure 5.3c) and STEAL2 – identical apart from the handshape used – represent a hand quickly snatching an object away.

Table 5.3 presents the iconic mapping for category II neutral verb forms. There is significant overlap with Table 5.2, with the exception that the handshape represents hands holding an object or instrument.¹⁴

A valid question to ask is why the forms in this category are not classified as body-anchored. After all, two of the body-anchored verb categories described

¹³Benedicto and Brentari (2004) describe an identical form in ASL and analyze it as a classifier predicate. An important reason for doing so is that the form, which is claimed to exclusively occur in transitive constructions, alternates with another form – articulated with two ϕ -hands to represent a thin cylindrical object such as a stick – that occurs in unaccusative constructions.

However, in the DGS data, I found that BREAK is used both in intransitive (ia) and transitive (ib) constructions. This is the primary reason I analyze BREAK in DGS as a neutral verb rather than a classifier predicate. For more discussion, see Section 5.3.2.

- (i) a. ${}_1\text{LET-KNOW}_a \setminus \overline{\text{INDEX}_b \text{ BREAK INDEX}_b}^{\text{RS}}$
 'I said to [my wife]: "The alternator is damaged"' [lei13-A-05:09.55]
- b. SECOND LIST-4:2 PERSON INDEX_a ALREADY BIT BREAK LEG
 'The second person had hurt their leg.' [koe11-A-04:08.10]

¹⁴Forms of this type thus make use of the manipulative image-producing technique (König et al., 2008).

Table 5.3: Iconic mapping for category II neutral verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : handling	Hand(s) of animate (human) entity (<i>ref-A</i>)
<i>Movement</i> : various	Hand(s) (<i>ref-A</i>) manipulate entity (<i>ref-B</i>) / instrument
<i>Location</i> : signing space	Locus of undergoer-like entity (<i>ref-B</i>)

in Chapter 4.2 also involve a hands-to-hands mapping. In fact, one of those categories includes verbs that involve a handling handshape (Chapter 4.2.2.3). Crucially, however, in the relevant body-anchored verb forms, the action represented by the hands either impacts on the body, as with the verb EAT, or it reflects actions performed by the hands that affect neither the body or any entity in the surrounding environment in any way, as with RUN1 (Chapter 4.2.2.4). The point is that in both cases, the verb forms can be said to be ‘body-centric’, whereas the neutral verb forms described in this section crucially also make iconic reference to body-external entities.

5.2.2.3 Category III

Category III verbs involve whole-entity or body-part handshapes representing an entity (but not an instrument). Subcategory IIIa is reserved for verbs denoting natural phenomena, which includes all weather verbs in the data set plus the verb BURN. Their handshapes represent aspects of natural phenomena. Subcategory IIIb includes forms with handshapes representing (parts of) human entities. All category III verbs are listed in (7); three forms are depicted in 5.4.

- (7) **Category III** | whole entity / body part
- a. Natural phenomenon: BURN, HAIL, RAIN, SNOW, THUNDERSTORM, WIND-BLOW
 - b. Human entity: LIVE3, MEET1, MEET2, SIT

LIVE3 (Figure 5.4a) and SIT (see Figure 5.1b earlier) are identical in form except for the accompanying mouthings. They are two-handed signs with handshapes in which the tips of the two bent fingers, according to two informants, represent the knees of a human being¹⁵ Despite the use of body-part handshapes,

¹⁵Again, under the alternative analysis that the handshapes actually represent eyes, the



Figure 5.4: Three category III(a) neutral verb forms, in which the hand(s) represent an entity or body part.

which are also commonly used in classifier predicates, there are strong indications that both these forms are conventionalized. Firstly, the hands are consistently oriented toward the signer, that is, hand orientation is not dependent on the orientation of the referent relative to the signer or to other referents localized in space. Secondly, both verbs are consistently signed with two hands, regardless of whether the relevant referent is singular or plural.

MEET1 and MEET2 (Figure 5.4b), which are minimal pairs only differing in handshape, denote symmetric events in which two referents participate in the same event.¹⁶ This is reflected in the forms by the use of the two hands, both representing a different entity. The point at which the two hands make contact can be construed as the (metaphorical) meeting point of the two referents. In Chapter 3.5.3, I offered several arguments for treating both these forms as conventionalized signs rather than classifier predicates. In a nutshell, I argued that a meeting event may involve more than the two entities represented by the signer's hands, a meeting event does not necessarily involve contact or even movement, and, in the case of MEET1, the (sideward) orientation of the hands does not reflect the orientation of individuals vis-à-vis each other when they meet in real life.

The five weather verbs RAIN, HAIL, THUNDERSTORM, SNOW, and WIND-BLOW also involve whole-entity handshapes of some sort. The ☞-handshapes used in the articulation of HAIL (Figure 5.4c), for instance, represent hail stones, while the

forms can still be said to represent body parts.

¹⁶The ☞-handshape used in MEET1 represents an upright animate entity. The handshape ☞ used in MEET2 seems less iconic, but it may represent eyes. Indeed, there are other verb forms in DGS verb which use the same handshape where an iconic mapping to eyes appears plausible; one example is the form GET-TO-KNOW.


form for THUNDERSTORM refers to a lightning bolt.¹⁷ Finally, BURN is articulated with two -handshapes making a contrary corkscrew movement to iconically represent flames.

Table 5.4 presents the iconic mapping for neutral verb forms of category III. Whole-entity or body-part handshapes represent either (part of) a human entity or an aspect of a natural phenomenon. The forms involve different sorts of movements, which all reflect the movements made by the entity that is represented by the verbs' handshapes; the verbs' place of articulation can be associated with the locus of the entity represented by the handshape.

Table 5.4: Iconic mapping for category III neutral verb forms.


ARTICULATORS	SOURCE
<i>Handshape:</i> whole entity / body part	Entity
<i>Movement:</i> various	Movement of entity
<i>Location:</i> signing space	Location associated with entity

5.2.2.4 Category IV

Category IV includes verb forms with abstract handshapes but iconically motivated movements. The forms in this category are listed in (8); three examples are depicted in Figure 5.5.

- (8) **Category IV** | iconic movement
 BE-DRY2, DIE1, HIDE, PLAY1, SING1, SING2

In BE-DRY2 (Figure 5.5a), the slightly downward movement in combination with the hand-internal change toward contact between the thumb and fingers references a decrease of something. However the form's handshape does not appear to give any iconic clues as to what entity is being decreased. DIE1 (Figure 5.5b) involves a movement that suggests an event of falling down, but the handshape is not one that would typically be used to represent human beings – or other living things, for that matter. SING2 (Figure 5.5c) is articulated with two closed beak handshapes moving sideways, in an abstract reference to a melody.

¹⁷Actually, THUNDERSTORM is articulated with a -handshape making tracing movement to reflect the discharge of lightning. Thus, it is technically the movement rather than the handshape that represents the 'entity' lightning.

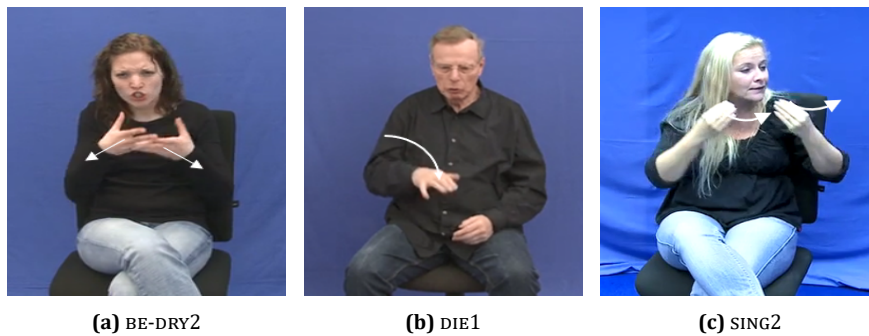


Figure 5.5: Three category IV neutral verb forms with an iconically motivated movement.

Table 5.5 presents the iconic mapping schema for category IV neutral verbs. Handshapes are not iconically motivated, while movements represent (real or metaphorical) movements of entities which can be rather abstract, such as in the case of SING2. The location of the sign can be associated with the location of that same entity (see Section 5.3.3 for discussion of the localizing behavior of neutral verbs).

Table 5.5: Iconic mapping for category IV neutral verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> various	Various
<i>Movement:</i> various; iconically motivated	Movement of abstract entity
<i>Location:</i> signing space	Location associated with abstract entity

5.2.3 Back to the semantic map

In the previous section, I proposed that there are four different categories of neutral verb forms in terms of their shared iconic mapping properties. In this section, I investigate how the verbs of each of the categories pattern on the semantic map from Chapter 3. Remember that the map, developed by Malchukov (2005), places different semantic categories in a network such that the connections between them reflect semantic proximity. For spoken languages, the prediction is that neighboring categories show similar behavior with respect to case-marking for transitivity, while categories that are far removed from one another are more likely to adopt different case-frames. For sign languages, I hypothesized that verb types respect the same restrictions posited by the semantic map because the se-

semantic event properties on which the arrangement of the network is based have the potential to be expressed iconically in sign language forms. Now that we have looked in detail at which kind of properties neutral verbs may iconically reflect in their forms, we can explore how the different iconic lexicalization strategies cluster together on the map. In Figure 5.6, the semantic map with neutral verb forms from Chapter 3 is reproduced with added color coding to reflect the different iconic mapping categories.

Recall that I pointed out in Section 5.2.1 that neutral verb forms can be divided into forms that iconically represent properties of two referents (category I-II) or just one (category III-IV). As such, it seems plausible that verb forms of the first two categories would be represented most frequently in categories toward the ‘transitive’ side of map (left), while verb forms of the other two categories would appear more often in categories toward the ‘intransitive’ side.

Indeed, category I verbs with instrument handshapes are all located in the ‘effective action’ class – the class associated with the highest degree of transitivity – on the left side of the map. Similarly, category II forms, typified by handling handshapes, also cluster in and around the ‘effective action’ class. The exceptions to this general tendency are the forms *BE-DRY1*, *BE-DRY3*, and *BE-WET*, which are positioned on the opposite side of the map. These examples thus serve as a reminder that forms that make iconic reference to two event participants do not necessarily have to denote transitive concepts, even if they are likely to.¹⁸

Thirdly, with the exception of *BURN*, category III neutral verb forms with whole-entity handshapes occur in categories toward the right side of the map, which are characterized by a relatively low degree of transitivity. *MEET1* and *MEET2*, which are in the ‘Reflexive/Middle’ category, do represent two participants in their form, but they also iconically portray a symmetric relation between these two participants. As such, it is fitting that these forms are positioned in the center of the map.

Finally, neutral verb forms of category IV are somewhat more scattered across the map. These forms have the fewest iconically motivated properties, and this relative paucity of iconic form-to-meaning mappings appears to be reflected in the absence of a clearly discernible semantic pattern for category IV forms.

In summary, the map in Figure 5.6 shows that there is a relation between

¹⁸An alternative possibility, of course, is that a verb form such as *BE-WET* actually means something along the lines of ‘assess the wetness of a flat object by feeling it between the fingers’, but in that case, we should expect to find the form (also) in transitive constructions, which is not the case. See Section 5.3.2 for a discussion of valency patterns with neutral verb forms.

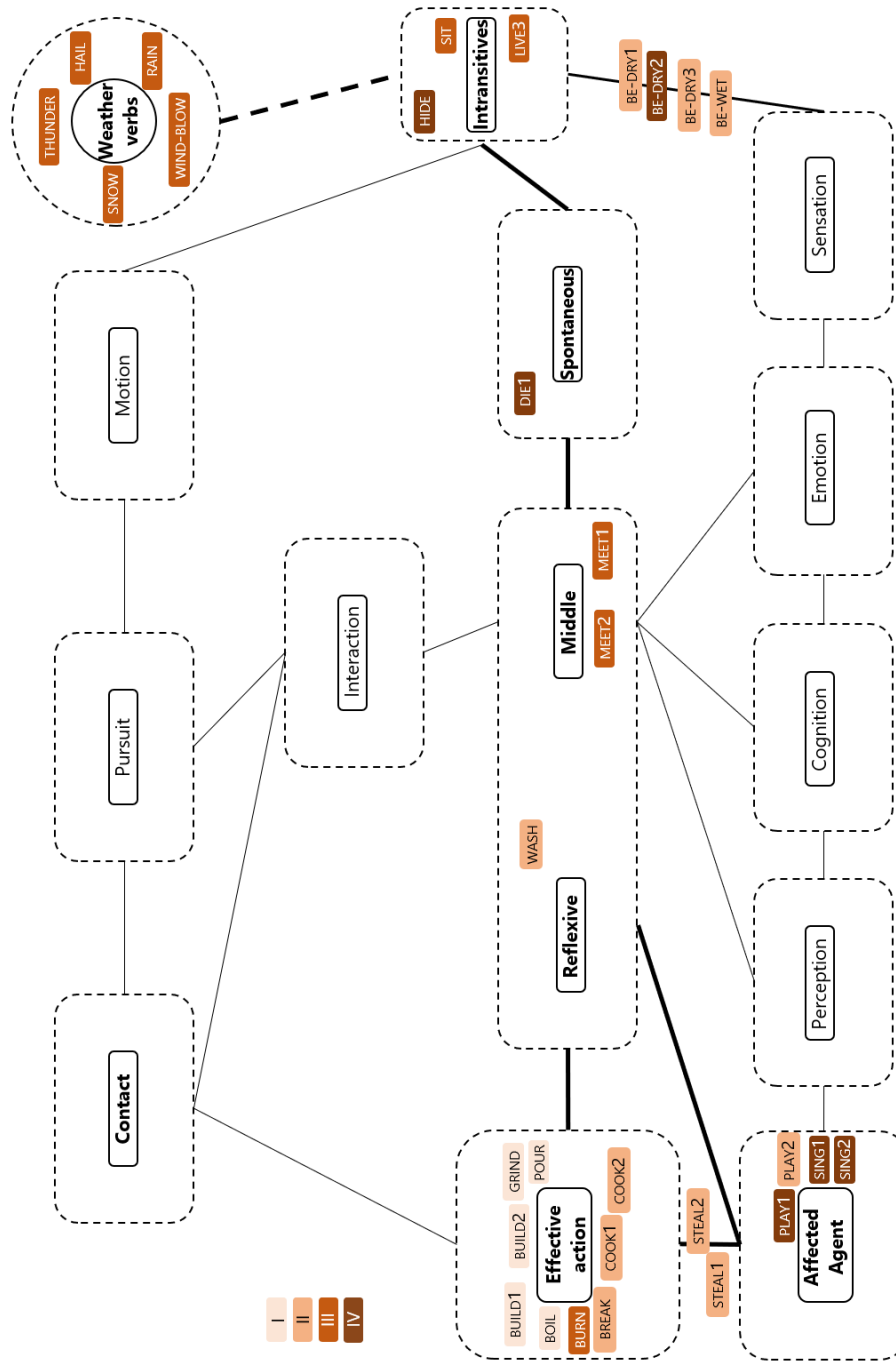


Figure 5.6: The semantic map for neutral verbs, color-coded to reflect the categories from the typology in Table 5.1.

the iconic properties and the (event) semantics of neutral verb forms, although it is also evident that iconic properties do not *determine* verb semantics (or vice versa).

5.2.4 Interim summary

To sum up, I have categorized the neutral verb forms in the DGS data according to recurring iconic lexicalization patterns. Category I forms involve an instrument handshape, forms of category II are distinguished by a handling handshape, category III verbs are articulated with whole-entity or body-part handshapes that represent either animate entities or natural phenomena, and verbs in category IV generally involve a lower degree of iconicity but do have an iconically motivated movement.

The mapping of forms from the different categories onto the semantic map reveals a split between verb forms with more transitive semantics (category I and II) and verbs forms with more intransitive semantics (category III). This split correlates with the a division in iconic mappings: while forms of category I and II make iconic reference to two event participants, forms of category III iconically represent one participant at most. Category IV forms also make iconic reference to just one event participant, but the forms are spread out across the map more than verbs from the other categories, with forms occurring in the 'affected Agent' class on the left, but also in and around the 'Spontaneous' and 'Intransitives' categories on the right. Interestingly, the absence of a clearly observable pattern on the semantic map coincides with a relative lack of iconic properties in category IV forms.

5.3 General sentence structure patterns

In Section 5.3.1, I investigate the preferred constituent order in clauses with neutral verbs in the corpus data, focusing especially on the position of the direct object relative to the verb. Section 5.3.2 discusses valency of neutral verb forms. It will be shown that the number of arguments different neutral verbs can take ranges between zero and three. In Section 5.3.3, I take a closer look at the localization abilities of neutral verb forms. It will be shown that the data present a rather complex picture. A complication is that verb forms are frequently articulated in the center of the signing space, in which case there does not appear to be localiza-

tion – yet the arguments with which such forms are expected to agree are often associated with this same default location, too. Nonetheless, some clear examples of localization of certain verbs were attested, and they are analyzed to determine with which types of arguments neutral verbs may spatially align. Finally, I investigate subject-drop patterns in constructions with neutral verbs in Section 5.3.4. Recall from Chapter 4.3.3 that clauses with body-anchored verbs resist the drop of non-first-person subjects, which led me to hypothesize that body-anchored verbs trigger an automatic first-person interpretation of a null subject due to an iconic association between the body of the signer and first person. If that is the case, then different behavior should be expected from neutral verbs.

5.3.1 Constituent order patterns

This section presents a description of constituent order patterns in the corpus data. Given that the aim is to be as descriptively meticulous as possible, I may distinguish between orders that are actually underlyingly the same (e.g. *S V* versus *S V S*, where one of the subjects may be a pronominal copy of the other). For more discussion on this matter, I refer the reader back to Chapter 4.3.1. Impersonal constructions are excluded from the analysis, as are nominal or adjectival uses of neutral verbs. In total, I analyzed 195 clauses with neutral verbs in the corpus data. 146 of these are main clauses; the remaining 49 are dependent clauses.

To reiterate from Chapter 2, I annotated constituent order for all examples in the data set, with different labels representing different types of constituents. In this section, we are solely concerned with the ordering of constituents that are either arguments (subject, object, indirect object) or verbs, modals or auxiliaries. Labeling of these constituents was done based on the semantic function of constituents in the clause (see Chapter 4.3.1 for a discussion of the implications of this methodological choice). Constituent types other than the ones mentioned, such as negative elements, will not be taken into account. I do, however, include information about prosodic boundaries (marked by ‘\’) as well as role shift boundaries (‘[]’), since it is uncertain whether role shift impacts on constituent order. Dependent clauses are marked by a ‘#’ in the annotations and are discussed in Section 5.3.1.2. Main clauses are discussed below.

5.3.1.1 Main clauses

In total, 39 different constituent orders were attested in main clauses with neutral verbs (N=146), of which 23 occur just once in the data. Table 5.6 lists all constituent orders that are attested twice or more.

Table 5.6: Constituent order in main clauses with neutral verbs (N=146) with a frequency of two or more (N=123). Square brackets indicate boundaries of role shift marking; backslash indicates prosodic boundary.

Order	#	Order	#	Order	#
Mod V	2	O/S V	3	[S V]	6
O \ S V	2	S V O/Loc	3	[V]	6
S Mod V	2	S V S	3	S [V]	9
V S	2	V O/Loc	3	V	31
V V'	2	S O V	4	S V	42
O V	3				

As with clauses that contain body-anchored verbs, the most common constituent orders are S V (N=42; 28.8%) and V (N=31; 21.2%). Clauses with a verb only can be assumed to involve subject drop unless they include a weather verb. Subject-drop patterns are discussed in Section 5.3.4.

The top five most frequent constituent orders is completed by the orders S [V] (N=9; 6.2%), [V] (N=6; 4.1%), and [S V] (N=6; 4.1%). If role-shift markers are disregarded, these five most common orders can be collapsed into two categories, yielding a total of 37 (25.3%) clauses with V order and 57 (39.0%) clauses with S V order. Thus, 94 (64.4%) of the 146 main clauses with neutral verbs have an (S) V order. These numbers suggest a preference for simple clauses that lack an overt object.¹⁹

Some examples of clauses illustrating S V, [V], and S [V] order are presented in (9).²⁰

- (9) a. INDEX_a STRONG **PLAY2** S V
 'They played extremely well.' [mst04-A-01:30.50]

¹⁹Of course, it is still possible that some of these verbs mark their object through modification of the verb's place of articulation. Such localization is the topic of discussion in Section 5.3.2.

²⁰Example (9c) actually displays a very interesting phenomenon: the verb appears to be localized to agree with a first-person subject, which is supposed to be disallowed for phonological reasons (see e.g. Keller, 1998). See Section 5.3.2 for more discussion.

- b. $\overline{\text{BUILD}}_1^{\text{rs}}$ [V]
 ‘[The craftsmen] were building.’ [hh04-B-05:41.60]
- c. INDEX₁ $\overline{\text{BE-BORED}}$ \ INDEX₁ $\overline{\text{SIT}}_1^{\text{rs}}$ S [V] \ S [V]
 ‘I was bored. I was just sitting around.’ [fra05-10:54.35]

Few of the examples represented in Table 5.6 include a direct object. Of those that do, it is worth noting that in all nine cases, the object precedes the verb. When the examples with constituent orders that occur just once in the data are also included, this pattern is preserved: OV order occurs a total of 14 times in the data, while VO order is attested just once. I should note that in three of these 14 examples with OV order, there is a clear prosodic break between the object and the verb, which may signal topicalization.²¹ These results contrast with what is observed in clauses with body-anchored verbs, which show a preference for postverbal objects (41 vs. 29 examples; see Section 4.3.1.1).

Two examples with neutral verbs and an S O V order are presented in (10). In both examples, the object as well as the verb are articulated in the center of the signing space. The verb’s location can thus be said to be congruent with that of the object, which in both cases is articulated at the same location.

- (10) a. $\overline{\text{OFTEN ALL SUNDAY INDEX}}_1$ $\overline{\text{POINT PLAY}}_1$ **PLAY**₂ S O V
 ‘I often played league games every Sunday.’ [koe13-A-04:15.40]
- b. INDEX₁ ONCE SAUCE **COOK**₂ S O V
 ‘I once cooked some kind of sauce.’ [hh01-A-05:21.90]

Table 5.6 includes one order with a constituent labeled ‘O/S’ (O/S V; N=3), and there are several other clauses with constituent orders occurring only once which include the labels ‘S/O’ and/or ‘O/S’. These labels are used in clauses with the symmetrical verbs MEET1 and MEET2 to reflect the reciprocal relation between the participating arguments. In general, if there are two arguments present in a clause with MEET1/2, the first is labeled S/O and the second O/S, as in (11a). In cases where there is only one argument present in the clause, the context was taken into account to establish whether the overt argument semantically appeared to be more subject-like or object-like. In several examples, the more subject-like


²¹Two sentences involve doubling of either the object or the verb; these examples are excluded from the count.

argument had already been identified as a referent in the discourse, thus increasing the likelihood for it to be dropped later on. This is what can be observed in example (11b), where the overt argument in the second clause is more like an object.²² Finally, a couple of examples include one argument representing both referents participating in the event denoted by the verb. An example is (11c), in which the signer first signs the participating referents individually, and then uses the pronominal INDEX_{1pl} to represent both event participants simultaneously. As it happens, the verb MEET1 does not show alignment between the initial places of articulation of the hands and the loci of the individual referents.

- (11) a. $\overline{\text{INDEX}_2 \text{ INDEX}_1 \text{ MEET1} \text{ INDEX}}$ re, rs
S/O O/S V O/Loc
 “‘Shall you and I meet there?’” [lei08-A-12:31.95]
- b. INDEX₁ ON-THE-MOVE \ COINCIDENCE INDEX_a DEAF_{1,a} **MEET1++** # S V \ O/S V
 ‘When we were on the move, [we] would randomly run into other deaf people.’ [fra15-A-06:21.85]
- c. INDEX₁ USUALLY DEAF INDEX_{1pl} **MEET1** ONE TV STORE EVENING S/O O/S S V O/Loc
 ‘Most of the time, myself and other deaf people – we would meet in the evening in front of the TV store.’ [fra12-B-02:59.80]

The constituent order patterns in clauses with MEET1/2 parallel those of clauses with other neutral verbs. A typical order would be S(/O) O(/S) V, although examples with MEET1/2 are somewhat more likely to include an object than clauses with other kinds of neutral verbs.

Finally, the neutral verbs SIT, LIVE1, LIVE3, MEET1, MEET2, and HIDE may occur with constituents labeled ‘O/Loc’, which may potentially be analyzed as locative arguments. Two examples with locative constituents have already been presented in (11a) and (11c); another is displayed in (12).

- (12) EVENING TOGETHER **SIT** CL():TABLE V O/Loc
 ‘We sat at the table at night.’ [goe03-A-06:32.30]

²²Subscripts preceding the verb indicate the respective starting locus of each hand. I use number subscripts for first and second person referents, but letter subscripts representing a locus in the signing space for third-person referents; see Notation conventions for a list of glossing conventions.

The preferred order for O/Loc constituents vis-à-vis the verb is V O/Loc (N=9), while just three examples exemplify O/Loc V order.²³ The favored position of an O/Loc constituent relative to the verb thus differs from that of a regular object; I discuss this matter further in Section 5.3.2.

To sum up, I have shown that main clauses with neutral verbs demonstrate a preference for OV order, in contrast to main clauses with body-anchored verbs, which prefer VO order. Locative constituents tend to come after the verb. In the next subsection, I discuss constituent order patterns in dependent clauses.


5.3.1.2 Dependent clauses

Table 5.7 lists all constituent orders in dependent clauses containing a neutral verb (N=49).

Table 5.7: Constituent order in dependent clauses with neutral verbs (N=49). Hashtag indicates dependent clause; square brackets indicate boundaries of role shift marking.

Order	#	Order	#	Order	#
# V O/Loc	1	# S V O V'	1	# O/S V	1
# V O V	1	# S Mod V	1	# S V O	2
# S/O O/S V	1	# O S V	1	# S/O V	4
# S V O/Loc V	1	# [V]	1	# S V	14
# S V O/Loc	1	# [S V S]	1	# V	17
# O/S [V]	1				

The most common pattern is verb-only (N=17; 34.7%), followed by SV (N=14; 28,6%). Note that in main clauses, it is the other way around. A possible explanation for this ratio difference is that in dependent clauses in which the subject is also the subject or topic of the matrix clause, subject drop is more likely to occur. In (13), for instance, the referent of DIE1 is already indicated with a pronominal pointing sign in the clause at the beginning of the example.²⁴

(13) INDEX₃ YOUNG \ KNOW2 \ CL():SHORT \ $\frac{\text{re}}{\text{DIE1}_3}$ # V
 'I know he was young – really young – when [he] died.' [koe18-B-02:03.10]

²³In one additional example, two copies of O/Loc precede and succeed the verb.

²⁴Example (13) starts with an embedded clause, followed by KNOW2, which makes up the matrix clause. The classifier that follows this verb appears to specify just how young the referent was and can be analyzed as a parenthetical expression. DIE1 is analyzed as making up a clause which is dependent on the embedded clause at the beginning of the example.

On the basis of the available data, it is not possible to establish the favored position of the object: there are just five examples with a direct object, and they illustrate a variety of patterns.

5.3.2 Valency patterns

In this section, I discuss valency patterns in clauses with neutral verbs with the main aim of gaining insight into the different types of constructions neutral verbs as a class can appear in. As a general note, I should remind the reader that corpus data cannot provide negative evidence. As such, it is possible that I describe a verb as only occurring in intransitive constructions, for instance, while it may actually be allowed in transitive constructions, too. To reduce the risk of making invalid assumptions, I do not discuss verbs for which fewer than four tokens (excluding impersonal constructions and nominalizations/adjectivizations) were available. This means that *BE-DRY1*, *BE-DRY2*, *BE-DRY3*, *BE-WET*, *BUILD2*, *GRIND*, *HIDE*, *POUR*, *SING1*, *SING2*, and *STEAL2* are not discussed here. Weather verbs, which also occur rather infrequently in the data, are analyzed as a group. For some verbs that occur more often in the data and for which certain argument-structure alternations appeared likely yet are unattested (or attested only once or twice), I discussed the grammaticality of different sentence constructions with two DGS informants. Whenever I did so, it will be mentioned in the text.

Weather verbs (*RAIN*, *WIND-BLOW*, *SNOW*, *HAIL*, *THUNDERSTORM*) never occur with overt arguments in the data set; two examples are presented in (14). (14a) includes three weather verbs that are separated by a conjunction and a palm-up sign, which serve as manual clause boundaries. In (14b), the two weather verbs are separated by a prosodic clause boundary. Weather constructions in DGS thus appear to be of the so-called predicate type, in which “the predicate of the sentence is responsible for the expression of weather” (Eriksen, Kittilä, & Kolehmainen, 2012, p. 385). None of the constructions with weather verbs in the data set include an (expletive) argument, which makes them what we may call atransitive. Such kind of constructions are by no means atypical in spoken languages: Latin as well as many Uralic languages, for instance, also have atransitive weather constructions (e.g. ‘*pluit*’ *rain.3SG*; ‘*it is raining*’ in Latin, Eriksen et al., 2012; Salo, 2011).

- (14) a. TWO LATER ALREADY ONCE-MORE **RAIN** OR **THUNDERSTORM** PU **HAIL**
V \ V \ V
 'Two days later, it was raining and thundering and even hailing once
 more.' [ber12b-A-17:57.65]
- b. SUDDENLY **THUNDERSTORM** \ **RAIN**
V \ V
 'Suddenly it started thundering and raining.' [sh06-A-01:12.70]

The verbs **DIE1** and **BURN** appear only in intransitive constructions in the data, with the subject being optionally omitted. **DIE1** selects an animate argument, while **BURN** (usually) takes an inanimate argument. Two examples with these verbs are presented in (15). (15b) includes two clauses which, together, express a causative event. The first clause states a cause – a plane flying into a building – represented with a classifier predicate. The result is indicated in the second clause with the neutral verb **BURN**: the World Trade Center (an omitted subject) catches fire. I asked the two DGS informants whether **BURN** may also occur in transitive constructions such as **INDEX₁ PAPER BURN**. One of the signers indicated that such constructions are ungrammatical; the other said he felt there might be a generational difference: older signers might sometimes use **BURN** transitively, but younger signers generally would not.

- (15) a. **HUMAN_a DIE1_a**
S V
 'Many people died.' [koe09-B-01:05.10]
- b. dh: **INDEX_a CL(_N):plane CL(_P):fly-into \ STILL **BURN****
 ndh: **CL(_P):skyscraper**
V
 'The plane crashed into [the WTC]; [the WTC] was burning.'
[hh03b-A-02:11.15]

LIVE3 and **SIT** take a subject and may also occur with a locative constituent (16). Kimmelman (2018a) analyzes such constituents as objects in his study on argument-structure patterns in RSL. His rationale is that in many languages, it is possible for verbs of location and movement to take a direct object – not introduced by a preposition – representing a location, as in 'John left the house' vs. 'John left for the pub'. Indeed, Kimmelman (2018a) claims that no special marking of locative constituents is present in RSL and therefore sees enough ground to treat them as arguments.

The DGS corpus data, however, reveal at least one qualitative difference between regular direct objects and potential locative objects in clauses with neutral

verbs: as discussed in Section 5.3.1, the former tend to precede verbs, while the latter tend to follow them, as in (16a). Thus, I analyze *SIT* and *LIVE3* as intransitive verbs that can occur with locative adjuncts, although some further research into the topic would be welcome.²⁵

- (16) a. INDEX₁ **LIVE3** AACHEN S V O/Loc
 'I was living in Aachen.' [koe11-A-01:47.20]
- b. INDEX₁ **SIT** S V
 'I was sitting.' [koe20-A-02:49.55]

Of the six clauses in the corpus data containing the verb *BREAK*, five include a single argument, which occurs in subject position and conveys an undergoer (17). While it is possible that these examples involve subject drop of an agentive argument, such an analysis seems implausible for a sentence like (17), as the immediate context does not provide any plausible candidates for an agent participant. The example also does not appear to involve an impersonal subject. Interestingly, most of the apparent intransitive instances of *BREAK* are accompanied by the mouthing 'kaputt', which is an adjectival predicate in spoken German that can be translated into English as the passive form 'broken'.

- (17) WEATHER ^{'kaputt'} **BREAK** S V
 'The climate is broken.' [mst10-B-04:52.90]

Just one clause seemingly includes an agentive subject (18), although the verb is accompanied by the mouthing 'verletzt' ('injured'), thus allowing for the possibility that the sign glossed as *BREAK* is actually a different verb.

- (18) SECOND LIST4-2 PERSON ALREADY BIT ^{'verletzt'} **BREAK** LEG S V O
 'The second runner had injured their leg a little.' [koe18-A-04:08.10]

In Benedicto and Brentari's (2004) seminal work on classifier predicates in ASL, they show that classifier predicates with handling and whole-entity handshapes may participate in argument-structure alternations, where handling handshapes are used in transitive constructions and whole-entity handshapes are used in unaccusative constructions. If DGS *BREAK* is actually a classifier predicate rather

²⁵I will nonetheless continue to use the label 'O/Loc' to refer to these constituents, as this is the label I used in the corpus annotations – following the annotation protocol adhered to by all members of the project this dissertation is a part of; see Chapter 1.5.

than a lexical verb, then one would expect it to (i) occur in transitive constructions and (ii) alternate with a classifier predicate that is combined with a different handshake (✎) in unaccusative constructions.

However, on the tentative conclusion that clauses such as (17) do not involve a null or impersonal subject, it is evident that the use of a handling handshake is not restricted to transitive constructions. Discussions with the two DGS informants provide further evidence that this judgment is justified. Both informants indicated that constructions such as *STICK/PEN BREAK* are grammatical, as are constructions that include an agentive subject such as *INDEX₁ STICK/PEN BREAK*. For the first sentence, the informants confirmed that the causer of the breaking event is unknown or irrelevant.

Still, it appears that it mattered somewhat to one of the informants what the shape is of the object that is (being) broken. The sentence *WINDOW BREAK* was judged as marginal by this signer, who preferred the use of a classifier predicate that more accurately reflects the way a window breaks.²⁶ However, the same sentence was judged perfectly grammatical by the other informant, who indicated that he interpreted the sentence as “*WINDOW SELF BREAK*” (“the window breaks by itself”), thus clearly not involving another referent. Thus, based on the corpus data and the discussions with informants, I conclude that *BREAK* is a labile lexical verb which may participate in an (unmarked) causative-inchoative alternation.

COOK1, *COOK2*, and *BOIL* may all occur in transitive constructions.²⁷ It seems that *BOIL* obligatorily takes a patientive direct object, as in (19c) and (19d), while *COOK1* and *COOK2* may participate in the unspecified-object alternation. That is, when a signer wishes to convey the general act of cooking, there is no direct object (19a), otherwise, there may be a (null or overt) object in the sentence referring to the substance being cooked, as in (19b) and (19d). Note that (19d), which represents an enumeration of activities, includes both the verbs *COOK1* and *BOIL*; *COOK1* does not take an object, but *BOIL* does (*COFFEE*).

- | | | |
|------|--|-------------------|
| (19) | a. <i>INDEX₂ CAN COOK2</i> | S Mod V |
| | ‘You can cook.’ | [hh01-A-02:31.95] |
| | b. <i>INDEX₁ FOOD COOK1</i> | S O V |
| | ‘I [wanted to] cook a meal.’ | [hh01-B-00:00.50] |

²⁶Nonetheless, the informant also remarked that *BREAK* could in principle be used in any possible context which involves a breaking event.

²⁷I should point out that almost all tokens of these three forms (22/25) occurred within one and the same dialogue.

- c. INDEX₁ **BOIL**_a POTATO_a \ INDEX₁ HATE_a # S V O
 'I hate cooking potatoes.' [hh01-A-03:13.95]
- d. INDEX₁ CUT \ (TO-)BUTTER \ **COOK1** \ COFFEE **BOIL** S V, V, V, O V
 'We prepared [the food] and made coffee.' [koe17b-B-02:48.00]

It is not quite clear from the data whether **BOIL** can participate in the causative-inchoative alternation, i.e. whether it can be used in constructions with the patientive argument as the surface subject. An example such as (20), which has an omitted argument ('pasta'), seems to suggest that it can: 'pasta expands when it boils' is a plausible interpretation of the sentence. However, there is an alternative translation possible for (20) – 'Pasta expands when you boil it' – in which case the example should be considered an impersonal construction with a demoted agentive subject. The two DGS informants both indicate that inchoative constructions with **BOIL** with no potential agent provided by the context, such as **WATER BOIL**, are grammatical.

- (20) $\frac{re}{\mathbf{BOIL}} \setminus \text{STRETCH}$ # V
 '[Pasta] expands when it boils.'/[Pasta] expands when you boil it'
 [hh01-A-06:04.55]

The symmetric verbs **MEET1** and **MEET2** occur in transitive constructions, as in (21a) and (21b) (the latter contains a null object).²⁸ In some cases, a single pronoun (e.g. 'we') or a collective noun (21c) refers to all participants in the reciprocal event with a single argument. As with **LIVE3** and **SIT**, **MEET1/2** may also occur with a locative constituent (21d).²⁹

- (21) a. $\frac{re}{\text{INDEX}_1 \text{ TEACHER } \mathbf{MEET1}} \setminus \frac{rs}{\text{INDEX}_1 \text{ LET-KNOW}_a}$ # S/O O/S V
 'Once, when I met my teacher, I tried to talk to him.'
 [fra03-A-02:12.00]
- b. INDEX_{1 1, a} **MEET1** \ **HUG2** # S/O V
 'Whenever he and I met, we would cuddle.' [hh06-B-01:12.45]

²⁸Double subscripts preceding instances of **MEET1** and **MEET2**, as in (21b) and (21d), represent the starting loci of each of the two hands, which subsequently move toward each other to make contact at the end of the verb's trajectory. For more details about the localizing properties of **MEET1/2**, see Section 5.3.3.

²⁹Note that in the articulation of the verb **MEET2** in (21d), the starting locus of one of the hands aligns with the locus associated with referents previously introduced in the discourse, and not with the location introduced at the end of the clause.

- c. THREE FOUR MONTH:4 ALREADY GROUP **MEET2++** S V
 ‘The group meets several times, three to four months in advance.’
 [stu13-B-02:10.60]
- d. THEN _{1,a} **MEET2** FRANKFURT INDEX_b V O/Loc
 ‘Then I met up with them in Frankfurt.’ [hb04-B-00:45.40]


PLAY1 is only attested in intransitive constructions in the corpus data, while PLAY2 can be used both intransitively as well as transitively. An intransitive sentence with PLAY1 is displayed in (22a); a transitive use of PLAY2, with a null subject, is shown in (22b). From the corpus data, it transpires that PLAY1 denotes either playing in the way that children do, or playing (i.e. acting) as in a theater piece. PLAY2, on the other hand, is typically used with the meaning of playing a (sports or card) game.

- (22) a. HEARING SELF_a MARVEL SELF_a \ DEAF INDEX_b SOMETIMES **PLAY1** # S V
 ‘Hearing people were surprised that deaf people can play (act) like that.’ [hh06-02:25.70]
- b. SKAT **PLAY2** O V
 ‘[I] play Skat [German card game].’ [goe01-B-06:10.55]

The intuitions shared by the DGS informants on the valency of PLAY1 and PLAY2 do not fully correspond to the patterns attested in the corpus data. One of the informants indicated that constructions with either verb form and (a) only an agentive subject, (b) an agentive subject and FOOTBALL as an object, and (c) an agentive subject and CARD.GAME or SKAT as an object are all perfectly grammatical. The other informant indicated that he found intransitive constructions most natural for both verbs. With regard to the two kinds of transitive constructions (b-c), this signer’s intuition was that older signers would use such constructions, but younger signers would not. He also indicated, in line with the corpus data, that PLAY1 is usually used in settings in which children are playing.

BUILD1 and WASH are transitive. Like other verbs, they may occur with null subjects or objects, but the target referents are always easily recoverable from the context. Two examples, one with each verb, are presented in (23a) and (23b).³⁰

³⁰The classifier in (23b) could also be analyzed as a predicate rather than an object.

- (23) a. INDEX_a CAREFREE $\overline{\text{WASH CAREFREE}}$ ^{rs} S [V]
 'She was cluelessly washing up.' [fra01b-A-00:35.70]
- b. ALREADY INDEX_a **BUILD1** CL():TOWERS S V O
 'They were already building new towers.' [fra01b-A-04:58.40]

Finally, STEAL1 can be used in ditransitive constructions, with the stealer being the subject, the person who is stolen from the indirect object and the entity being stolen the direct object. (24a) includes both an indirect and a direct object.³¹ (24b) includes a subject and a direct object. Since there were no examples that overtly included three arguments in the clause, I checked with the two informants whether that would be grammatical; they both indicated that it is.

- (24) a. TOURIST++ ALL DEAF MONEY **STEAL1** 02 O V
 'Money gets stolen now and then from us, deaf tourists.'
 [stu17-A-03:24.85]
- b. $\overline{\text{WHO HAVE CL}(\img alt="hand icon" data-bbox="495 500 515 515"/>):\text{FUSE } \text{STEAL1 } \text{CL}(\img alt="hand icon" data-bbox="545 500 565 515"/>):\text{FUSE}}$ ^{rs} [S Aux-sp O V O]
 "Who stole the fuse?" [fra03-A-04:27.40]

In summary, some neutral verbs occur exclusively in intransitive constructions, while others are able to participate in causative-inchoative and unspecified-object alternations, and yet others are consistently used transitively. Weather verbs do not take any arguments at all, and there is also a neutral verb (STEAL1) that may be used ditransitively. Thus, neutral verbs involve a wide range of valency patterns and argument-structure alternations. Indeed, the same extent of variation is found in RSL, for which Kimmelman (2018a) reports that all possible transitivity types are attested among neutral verbs.

5.3.3 Localization properties

In this section, I scrutinize the localization properties of neutral verbs. As discussed in Section 5.1.2, Meir (1998) has claimed for ISL that neutral verbs have the ability to agree with their internal argument, and this claim is echoed in e.g. Costello (2015) for LSE. To assess whether a similar principle holds for DGS, annotations for localization properties were made on two tiers, namely AS-ext-localization and AS-int-localization. On the former tier, I indicated whether there is

³¹(24a) is actually an impersonal construction, but there were no regular examples in the data that include both types of object.

alignment between the place of articulation of the verb and the agent-like referent, if present. On the latter tier, I signalled whether there was locus alignment between the verb and the patient-like referent, if present. The underlying rationale here is that agentive referents are probably external arguments, whereas patientive referents are more likely to be internal arguments. Of course, one would need to apply syntactic tests to verify the external or internal status of arguments, but it is not possible to apply such tests to corpus data. Still, the external/internal argument division supposedly reflects a thematic distinction between arguments (Grimshaw, 1990; Kratzer, 1996), such that, for the purposes of this chapter, it seems reasonable enough to determine the syntactic status of an argument based on its thematic role. Note that in intransitive constructions, an annotation had to be made on only one of the tiers. In a construction with an intransitive use of *PLAY2*, for instance, the single argument is fairly agentive, and therefore an annotation was made on the AS-ext-localization tier. In intransitive constructions with a verb like *BURN*, on the other hand, the sole referent is highly patientive and therefore an annotation was made on the AS-int-localization tier.

The inventory of annotation labels I used to represent the localization properties of neutral verb tokens includes nine basic values (also see Chapter 2.3.4). The label 'localized' signals that a verb token has clearly been localized at a previously established referent locus in the signing space, but not the center of the signing space. 'Localized-new' signals that a verb has been localized at a distinct locus which had not previously been associated with a referent (i.e. localization 'on the fly'). The label 'congruent-a' is assigned when a verb appears to be localized, but its place of articulation might have been influenced by an immediately preceding sign articulated at the same location. In another case of congruence, annotated as 'congruent-b', both the referent and the verb are articulated at the center of the signing space. As such, it cannot be determined whether locus alignment is intended or merely coincidental.

The label 'incongruent' indicates that a verb is articulated at a location that is clearly different from a referent locus. 'Default' signals that there is no locus for the verb to align with because the verb does not take any arguments, which is the case for weather verbs, or because it takes a null impersonal subject or, in a couple of cases, a null generic or non-specific argument. I propose in Chapter 8.3.5 that such arguments are associated with the center of the signing space by default. The label 'unclear' indicates that the referent the verb is expected to agree with has not been localized and the verb itself is articulated at the center of the signing

space. The label ‘default1st’ indicates that the subject of the verb is first person, in which case it is expected that the verb is phonologically blocked from localizing (e.g. Keller, 1998). Interestingly, there appear to be a couple of counterexamples to this expectation (to be discussed below); these were annotated as ‘localized1st’.

All the localization patterns introduced above are illustrated with pictures and examples in the discussion of the results below.

5.3.3.1 Internal arguments and localization

I start with a discussion of the patterns of alignment between neutral verb tokens and their internal argument, if present. Of the 195 examples that include a neutral verb (excluding nominalizations/adjectivizations and impersonal constructions), 135 involve an argument – be it overt or null – that is analyzed as internal based on its thematic role.³² Table 5.8 tabulates the frequencies of the different localization patterns in this set of 135 tokens.

Table 5.8: Patterns of alignment of neutral verb tokens in relation to their internal argument (N=135).

Localization pattern	#	%
Localized	16	11.8
Localized-new	4	3.0
Localized1st	4	3.0
Congruent-a	21	15.5
Congruent-b	34	25.2
Default1st	19	14.1
Unclear	10	7.4
Incongruent	12	8.9
Default	15	11.1

As the table shows, fairly few verbs in the data set are annotated as ‘localized’ (N=16; 11.8%) or ‘localized-new’ (N=4; 3.0%). Most of these 20 instances concern usages of the verb DIE1 (N=15). This verb form happens to be one of the few forms in the data set that usually take an animate internal argument. I discuss

³²29 examples include the verbs MEET1 and MEET2, which I treat as hybrids between neutral and agreeing verbs. In terms of agreement marking, however, these forms are more like agreeing than like neutral verbs, as they are able to mark two arguments instead of one. The verbs are discussed separately at the end of this section. The remaining 31 examples involve only an external argument; see Section 5.3.3.2.

the examples with DIE1 before turning to the localizing behavior of other types of neutral verbs. The discussion of the examples with DIE1 also serves to illustrate the different localization patterns that may occur with neutral verbs.

(25) displays an example of a construction with a localized instance of DIE1. Figure 5.7 illustrates the articulation of the pronominal subject and the localized verb in this example. Several signs intervene between the subject and the verb, the last of which (LATER) is articulated at a location which differs from that of the neutral verb. As such, the localization of DIE1 cannot result from phonological assimilation processes.

- (25) INDEX_a BIT PU LATER DIE1_a S V
 'She died later.' [fra05-B-09:55.15]



Figure 5.7: The signs INDEX_a (left panel) and DIE1 (right panel) from (25), which are articulated at the same locus on the vertical plane.

Another interesting example of localization is presented in (26); Figure 5.8 illustrates the final stretch of signs in the example with video stills. As can be observed in the first two panels of Figure 5.8, the signer first signs PICTURE, representing a television screen. As shown in the third panel, she then mouths 'Diana' while holding the final hand configuration, which appears to be a strategy to assign the referent an R-locus at the center of PICTURE. Finally, the signer signs DIE1 at this location. Thus, the verb is clearly localized, although the location it aligns with has not been associated with a referent in the most conventional way, i.e. with the use of a pointing sign (e.g. Lillo-Martin & Klima, 1990). Rather, it seems that eye gaze, which has been cited as one of several different localization strategies for DGS in Steinbach and Onea (2016), localizes the referent in this example.³³ (26)

³³Other strategies cited by Steinbach and Onea (2016), in addition to pointing, include

additionally appears to involve a strategy which has previously been described by Schlenker (2018a) for ASL: a locus associated with a certain spatial location gets re-used as a referent locus.

- (26) THROUGH INDEX₁ TV BEGINNING 8-O'CLOCK SWITCH-ON \\
 IMMEDIATELY PICTURE 'diana' DIE1_a # S V
 'When I switched on the tv at 8 o'clock, [I learned that] Diana had died.'
 [sh07-A-04:03.10]

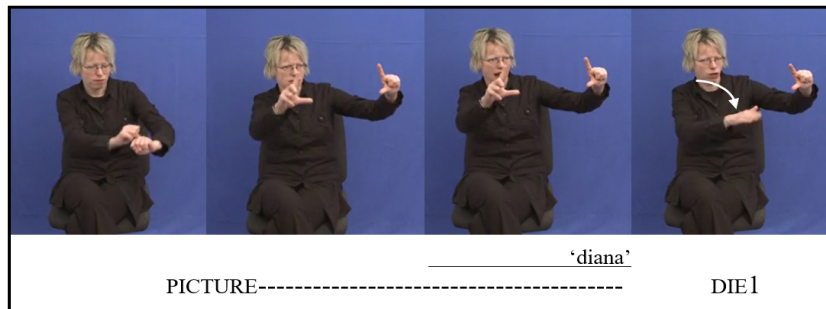


Figure 5.8: Video stills representing the final signs in the second clause in (26). The signer mouths 'Diana' while manually holding the previous sign PICTURE, before localizing the verb DIE1 in the middle of the held sign.

In three examples with DIE1, there are no signs at all of overt localization of a referent, yet the verb is clearly articulated at a non-neutral location in the signing space; these constructions were annotated as 'localized-new'. One example is presented in (27); the articulation of the verb toward the left of the signing space is illustrated in Figure 5.9.³⁴ The subject of the verb had not been localized at all: the three signs which make up the subject (POSS₁ MAIN MOTHER) are use of the sign PERSON, localization of a noun sign itself, implicit localization based on the ordering of arguments in a clause, and body shift.

³⁴Technically, the signer's hand is rather close to the center of the signing space in the articulation of DIE1 in Figure 5.9. However, I would maintain that DIE1 is localized at a non-default location, since it can be observed that the fingertips of the signer's hand are clearly directed toward the signer's left. In the verb's citation form, on the other hand, the fingertips are directed forward. In relation to this point, in citation form, the verb DIE1 is generally articulated slightly toward right of the center of the signing space (for right-handed signers); this is the phonologically least effortful way to articulate the sign. Thus, what should be regarded as the center of the signing space may differ somewhat for verbs depending on what their basic place of articulation is in citation form. Whether I analyzed a verb token as being articulated at the 'center' of the signing space or not was thus always determined in relation to the place of articulation of the verb's citation form.

all body-anchored. In the discourse preceding the example in (27), another referent ('grandmother') had been introduced at a contrastive location on the signer's right. Localization of the subject in (27) may thus have occurred implicitly, with the verb DIE1 utilizing this locus despite it not having been explicitly introduced.

- (27) ALSO INDEX₁ SEVENTEEN \ POSS₁ MAIN MOTHER DIE1_a S V
 'When I was seventeen, my mother died.' [fra05-B-09:59.45]

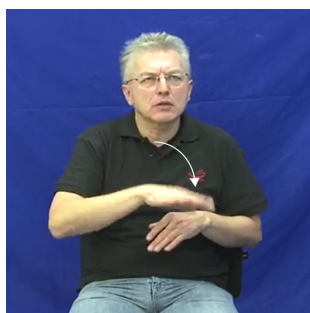


Figure 5.9: Video still illustrating the localized instance of the verb DIE1 in (27).

In 17 examples, DIE1 is congruent. In 14 of those cases, annotated as 'congruent-a', the verb is articulated at the same locus as the immediately preceding sign. In (28), for instance, a pronominal pointing sign is immediately followed by the neutral verb at the same locus, as illustrated in Figure 5.10. It is therefore not possible to establish whether DIE1 genuinely has been localized, or whether it is simply articulated at the same locus because of phonological assimilation processes. In the three other congruent cases, the verb is articulated at the center of the signing space, and the referent it is supposed to align with is signed at this same location. Such instances are labeled 'congruent-b'.

- (28) INDEX_a DIE1_a S V
 'They died.' [lei02-B-02:27.10]

Although the majority of instances of DIE1 are either localized or congruent with a referent locus (N=32), there are also a number of instances of incongruence between the verb and its subject with respect to the place of articulation (N=6).³⁵

³⁵There are also a couple of 'unclear' cases, which I do not discuss further because they could be analyzed in a variety of ways, and as such they are not informative about the localizing properties of DIE1.



Figure 5.10: A congruent instance of DIE1. In the left panel, the pronominal subject is articulated with the signer's right hand (left in the picture). In the right panel, the signer localizes DIE1 – the immediately succeeding sign – at the same locus. The signer's left hand holds a pointing sign referring to another referent from the previous clause.

An example is shown in (29); video stills displaying the articulation of the subject and the verb, respectively, are presented in Figure 5.11. As can be observed, the subject of DIE1 is localized toward the signer's left, while the verb is articulated at the center of the signing space (indicated with the subscript 'c').

- (29) THEATER FACIAL-EXPRESSIONS GREAT \ UNTIL DATE INDEX_a **DIE1**_c PU
 SV \ # S V
 'His facial expressions were always spectacular in the theater, up until the
 day he died.' [koe18-A-00:25.45]



Figure 5.11: Video stills illustrating the articulation of the pronominal subject and the verb DIE1 in (29), each localized at a different location.

To summarize, DIE1 can be, and often is, localized to align with the R-locus of the subject, although I have also observed some examples of clear incongru-

ence. DIE1 also happens to be one of the few verbs in the data set which (a) exclusively occur in intransitive constructions, and (b) generally take an animate internal argument. LIVE3 and SIT are similar to DIE1 in these respects. However, these verb forms consistently resist localization, such that they might actually be better classified as body-anchored verbs. Even though both forms are articulated in the signing space rather than on the body, the hands seem to have a fixed place of articulation to preserve the iconic mapping between the position of the hands and the position of the knees – iconically represented by the signer’s hands – relative to the body. HIDE appears to behave more like DIE1, but the corpus data provide too few examples to thoroughly assess its localization properties. All other neutral verbs select, or have the option to select, inanimate internal arguments. The remainder of this section focuses on these verbs.

The corpus data show that inanimate arguments tend to be articulated at the center of the signing space rather than some locus toward the signer’s left or right. Therefore, if a neutral verb is articulated at the same location, it can be said to be congruent with its internal argument, although it cannot be stated with certainty that there has been deliberate localization. Indeed, of all the annotations made on the AS-int-localization tier, 34 (25.2%) are annotated as ‘congruent-b’. An additional 21 (15.5%) examples are analyzed as ‘congruent-a’, in which case the verb and the directly preceding sign have the same place of articulation. In several of those cases, the preceding sign is itself the internal argument, such that these also count as ‘congruent-b’ examples.

Take (30), for instance. As shown in the right panel of Figure 5.12, the verb BURN is articulated with the two hands about equally far removed from the center of the signing space. The argument that undergoes the burning – a boat – had been introduced a couple of sentences earlier. As can be observed from the left panel in Figure 5.12, BOAT, too, is articulated at the center of the signing space. Thus, the two signs are congruent in their their place of articulation, although it is unclear whether this congruence is deliberate.

(30) CAN BURN PU Mod V
 ‘[The boat] could catch fire.’ [hh01-A-04:18.80]

Just three verb tokens which take an inanimate object are clearly localized; all examples involve the verb BOIL. One of the constructions is shown in (31a), reproduced from (19c). As can be observed, BOIL is articulated at the locus associated with the direct object POTATO. At the same time, there are hardly any neu-



Figure 5.12: Video stills illustrating the articulation of the verb BURN in (30) (right panel) and the subject referent BOAT signed a couple of clauses earlier (left panel). Both are signed at the same central locus in front of the signer.

tral verbs that are clearly *not* localized: just two incongruent examples occur in the data set. One incongruent verb is displayed in (31b); the argument the verb is expected to align with ('the film') had been localized earlier at a locus toward the signer's right. The verb BE-DRY2, however, is clearly articulated at the center of the signing space.

- (31) a. INDEX₁ **BOIL**_a POTATO_a \ INDEX₁ HATE_a # SVO \ SV
 'I hate cooking potatoes.' [hh01-A-03:13.95]
- b. $\frac{hs}{\overline{NOT}}$ BORING **BE-DRY2**_c $\frac{hs}{\overline{NOT}}$ V V'
 '[The film] wasn't boring or dry.' [hb04-B-05:35.90]

Although only few neutral verb tokens are clearly localized at the locus associated with their internal argument, the proportion of verbs that are at least congruent (59%) is quite high. Indeed, de Beuzeville, Johnston, and Schembri (2009), who carried out a corpus study on the modification properties of agreeing and neutral ('locatable') verbs in Auslan, report that a mere 28% of the neutral ('locatable') verb tokens in their data set are congruent or localized. The remaining 72% of examples were analyzed as unmodified.³⁶ In contrast, just 9% of all DGS examples are analyzed as being incongruent with their internal argument.

³⁶de Beuzeville et al. (2009, p. 64) define congruent forms as being identical to their citation form while also "congruent with a spatial arrangement of locations associated with referents already established in the text". This definition appears to correspond to what I refer to as 'congruent-b' in the present study. It is not quite clear in which category 'congruent-a' forms are included in de Beuzeville et al.'s (2009) study, but they are probably annotated as modified forms.

Note that the annotation system I used is more fine-grained than the one adopted by de Beuzeville et al. (2009). That is, I used additional annotation labels for verb tokens that (i) involve a first-person internal argument such that localization of the verb is phonologically blocked ('default1st'; 14%), (ii) involve an impersonal or non-specific argument resulting in a default place of articulation of the verb at the center of the signing space ('default'; 11%), and (iii) are expected to align with an argument which itself has not been overtly localized ('unclear'; 8%). It appears that all these categories are collapsed into the 'unmodified' category in the Auslan study by de Beuzeville et al. (2009). Even so, the overall results show that there is a clear contrast between DGS and Auslan in terms of the localizing properties of neutral verbs.

This is a rather striking finding. Although the results of the two studies could, of course, reflect an actual difference in how often neutral verbs tend to localize in the respective languages, they might also indicate a difference in perspective with respect to which locations in the signing space may function as R-loci. In this regard, it is quite revealing that de Beuzeville et al. (2009) report that only 18% of 'locatable' *nouns* are localized or congruent (it is not quite clear what congruence entails here). Apparently, the articulation of a noun at the center of the signing space is not considered to be an instance of localization. Thus, neutral verbs articulated at the center of the signing space in congruence with the place of articulation of a nominal internal argument appear to be treated as unmodified instances in de Beuzeville et al. (2009), whereas I considered such instances to be congruent.

The issue of what may be considered an R-locus is a central one to consider when assessing the localization properties of neutral verbs. If the center of the signing space is argued not to be a potential R-locus, then the majority of neutral verb tokens in DGS do not localize. On the opposite view, localization would be much more common.

In order to gather better insight into the function of the center of the signing space, I presented two DGS informants with sets of sentences containing neutral verbs and one or two arguments, which minimally differed with respect to where the verb and/or arguments were localized. The informants were asked to describe whether they found the sentences natural, and if not, what type of construction they would use to convey the same meaning.

The discussions made three points clear. Firstly, the informants consistently rejected examples in which inanimate arguments were localized at distinct loci in

space. Instead, the informants preferred sentences in which the inanimate object is articulated in the center of the signing space, with the neutral verb also being articulated there.³⁷ Secondly, for animate arguments, localization on the signer's left or right is generally considered more natural – although it is not obligatory – and localization of neutral verbs to align with a previously localized animate argument is also deemed natural. Thirdly, localization of inanimate arguments *is* allowed, albeit not obligatory, in contexts in which two inanimate objects are contrasted with one another, as in (32). Meir (1998) refers to this kind of mechanism as pragmatic agreement.

- (32) FATHER SPAGHETTI_a **BOIL**_a \ TOMATO_b CUT_b
 'Father boiled the spaghetti and cut the tomato.'

Thus, the informant data provide confirmation of the suspicion that inanimate arguments generally associate with the center of the signing space.³⁸ A related question which has so far remained unanswered is whether the alignment of a neutral verb with the location associated with an internal argument – even if both are articulated at the center of the signing space – should be considered an expression of agreement. In the next section, in which I study the potential for neutral verbs to localize at the locus of the *external* argument, I do some reverse engineering – again based on a combination of corpus and informant data – to suggest that it should. First, I address two outstanding issues here.

Firstly, recall that neutral verbs generally resist agreement with a first-person argument, since they are generally assumed to resist being articulated on or near the body. Interestingly, however, I found four examples in the DGS corpus data of verbs usually articulated in the signing space which seem to have undergone exactly such a transformation. Two of these examples are illustrated with video stills in Figure 5.13a and 5.13b; the constructions in which they appear are represented in (33a) and (33b), respectively.³⁹

- (33) a. INDEX₁ $\overline{\text{BE-BORED}}$ ^{RS} \ INDEX₁ $\overline{\text{SIT}}$ ^{RS} S [V] \ S [V]
 'I was bored. I was just sitting around.' [fra05-10:54.35]

³⁷The potential for neutral verbs to localize at loci associated with external arguments was also discussed with the informants; the results are addressed in Section 5.3.3.2.

³⁸In this way, DGS appears to differ from ISL, for which Meir (1998) shows that inanimate arguments can be placed at a distinct location in space, even in non-contrastive contexts.

³⁹For citation forms of *SIT* and *BREAK*, see Figure 5.1b and Figure 5.3b, respectively.

b. INDEX₁ BREATHLESS \ VERY INDEX₁ $\overline{\text{BREAK}}_1^{\text{rs}}$ SV \ S [V]
 'I was breathless and felt broken.' [koe13-A-02:08.15]

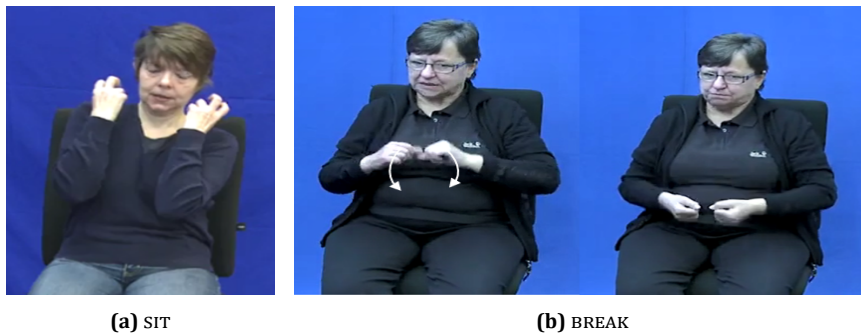


Figure 5.13: Two neutral verbs in first-person form.

The instance of *SIT* in Figure 5.13a is articulated considerably closer to the body than its citation form. The position of the hands is also higher than usual, although this could simply be a phonological consequence of body-anchoring the sign. It appears this form may be an idiomatic expression with the meaning ‘hang around’ or ‘sit back’. Indeed, there are two other instances of this body-anchored version of *SIT* in the corpus, both of which fit with such an interpretation.

The token of *BREAK* in (33b) involves an orientation change such that the palms face toward the signer instead of downward. The verb is also articulated closer to the chest than in citation form. Unlike *SIT*₁, this body-anchored form of *BREAK* does not appear to be an idiomatic expression. Thus, there seems to be some limited possibility for at least some neutral forms to express first-person localization. Further research is necessary to determine how productive such a mechanism is.

Finally, in the discussion presented in this section, I have not yet addressed the behavior of *MEET1* and *MEET2*. As mentioned previously, both forms have a hybrid status, displaying properties of both neutral verbs and agreeing verbs. The two forms are special in that they denote symmetric events which involve two referents that are in a reciprocal relation, as iconically reflected in their forms (see Section 5.2; also see Börstell, Hörberg, & Östling, 2016)). Indeed, the verb forms – both two-handed signs – may simultaneously reference two event participants by having each hand start out at a different locus, as in (34), illustrated in Figure 5.14. In their ability to spatially align with two arguments, *MEET1* and *MEET2* are

more like agreeing verbs, although they are atypical in that there is no movement from subject to object. Instead, the forms are characterized by a simultaneous movement from both the subject locus (usually dominant hand) and the object locus (usually non-dominant hand) to a location in the middle.

- (34) INDEX₁ ONLY INDEX_{1, a} **MEET1+++** S V
 'I would often meet up [with the hearing kids].' [fra05-B-02:26.10]

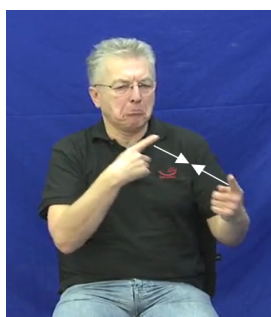


Figure 5.14: A localized/agreeing instance of MEET1.

The corpus data show that alignment of MEET1/2 with subject and object loci is very common. Of the 30 tokens with either form, 27 display unambiguous subject agreement and 16 show clear object agreement; in an additional seven cases, the verb seems to introduce an object locus on the spot. There are also a number of congruent cases, where the relevant referent loci are at or close to the center of the signing space. One example shows clear incongruence. In (35), repeated from (11a), the referents involved in the event are first and second person (under role shift). As can be observed from Figure 5.15, however, the hands begin their trajectory at the signer's left and right. Thus, based on their alignment properties, MEET1 and MEET2 can be said to behave more like agreeing verbs than like neutral verbs, since they align with two arguments with regularity.

- (35) $\frac{\text{re, rs}}{\text{INDEX}_2 \text{ INDEX}_1 \text{ MEET1 INDEX}}$ [S/O O/S V O/Loc]
 "Shall you and I meet there?" [lei08-A-12:31.95]

5.3.3.2 External arguments and localization

In this section, I investigate if neutral verbs can be localized at a locus associated with an external argument, and if so, under which conditions. I hypothesize the



Figure 5.15: An incongruent instance of MEET1.

following:

- in transitive constructions, localization of a neutral verb at the locus of the external argument is not possible;
- in unergative constructions, localization of the neutral verb at the locus of the external argument is possible.

If both predictions above are borne out, that can be taken as an argument for analyzing the center of the signing space as a potential locus for inanimate referents. If it were not, the neutral verb would in principle be free to localize at the locus associated with the (animate) external argument.

Table 5.9 tabulates the frequencies of the different annotation values on the AS-ext-localization tier. There are 63 neutral verb constructions in the data set with an (overt or null) external argument. I distinguish between neutral verbs in transitive vs. intransitive constructions, since the predictions with respect to location alignment between the verb and the external argument differ for the two types of constructions.

The results show that none of the neutral verbs in transitive constructions localize at the location associated with the external argument, although there are a few tokens (N=3) which are congruent with the locus of the external argument. The majority of transitive constructions (N=18) involve a first-person subject and a neutral verb articulated at the center of the signing space, from which no meaningful conclusions can be drawn. Importantly, however, ten neutral verbs are clearly incongruent with the place of articulation of the external argument. In contrast, just two of the neutral verbs that occur in constructions with a single argument are annotated as incongruent. In addition, congruence (N=15) and local-

Table 5.9: Patterns of alignment of neutral verb tokens in relation to their external argument (N=63).

Localization pattern	Transitive		Intransitive	
	#	%	#	%
localized	-	-	6	19.4
congruent-a	-	-	3	9.7
congruent-b	3	9.4	12	38.7
default1st	18	56.3	7	22.6
unclear	1	3.1	1	3.2
incongruent	10	31.3	2	6.5

ization (N=6) of neutral verb tokens in intransitive constructions is clearly more common than in transitive constructions.⁴⁰ These results fit with the predictions stated at the beginning of this section.

I should note that of the six localized instances, four cases appear to mark a direct contrast. Two of these constructions are represented in (36a) and (36b). In (36a), which includes two separate clauses, the two instances of *COOK1* are articulated at the loci associated with their respective subjects. A similar sort of contrast is expressed in (36b).

- (36) a. INDEX₁ MOTHER **COOK1**_a [...] WOMAN INDEX_b **COOK1**_b S V [...] S V
 'My mother always cooked [...] now my wife cooks.'
 [hh01-A-06:48.65]
- b. dh: HEARING **SING1**_a \ DEAF SIGN_b \ COMPARISON
 ndh: INDEX_a..... S V \ S V \ V
 'Hearing people sing and deaf people sign. It's comparable.'
 [hh03a-B-04:54.30]

The remaining two examples display bona fide localization of an unergative neutral verb at the external argument's locus. In (37a), *PLAY1* is localized at the locus associated with *CHILD++*, which had been assigned an R-locus two clauses earlier (37a). In (37b), *COOK1* is localized at the locus of a previously introduced referent.

⁴⁰I should remark, however, that there are also fewer first-person external subjects among the intransitive constructions.

- (37) a. CHILD++_a \ LET \ MUCH **PLAY1**_a CASUAL # S \ V \ # V
 '[She] let her children play as much as possible.' [lei02-B-04:50.90]
- b. **COOK1**_a HOW V
 '[I observed] how [he] cooked.' [hh01-B-07:11.25]

Altogether, the corpus data provide support for the hypotheses stated above: there are no neutral verb tokens that localize at the external argument's locus when there is an internal argument, while such localization does (sometimes) occur in unergative constructions. Admittedly, the pool of data these conclusions are based on is rather small, and they can also not provide negative evidence. I therefore discussed the localizing behavior of neutral verbs with the two DGS informants based on sets of sentences such as in (38). Note that in the subscripts, 'a' represents a location on the signer's left or right, and 'c' stands for the center of the signing space.

- (38) a. FATHER INDEX_a COOK1_a
 b. FATHER INDEX_a COOK1_c
 c. FATHER INDEX_a SPAGHETTI_c COOK1_c
 d. FATHER INDEX_a SPAGHETTI_c COOK1_a

The informants both indicated that the sentence (38a), with intransitive use of COOK1 and localization of both the subject and the verb at an off-center location, is natural. However, the sentence in (38b), where the subject is localized but the verb is articulated at the center of the signing space and thus incongruent, was also considered natural. One of the signers even preferred this construction over the one in (38a). In other words, the informants clearly indicated localization is possible not but obligatory.

With regard to transitive constructions, such as the ones in (38c) and (38d), the informants were in agreement that the neutral verb cannot be articulated at the locus of the external argument, i.e. (38d) is considered ungrammatical. The construction in (38c) was judged grammatical. Again, these results are in line with the predictions stated at the beginning of this section.

To sum up, based on the corpus data and the discussions with informants, I conclude that neutral verbs have the ability to localize at the locus associated with (a) the only argument in the clause, independent of whether it is an external or internal argument, or (b) the internal argument in transitive constructions. The

corpus data showed that inanimate internal arguments tend to resist localization at a locus on the signer's left or right, instead preferring to be associated with the center of the signing space. I have proposed that the center should nonetheless be treated as a referent locus which is available for agreement. An argument for this claim is that neutral verbs in transitive constructions may not agree with their external argument, which suggests that they are not free to do so because they already agree with an argument associated with the center of the signing space. Note that it cannot be concluded on the basis of the data that neutral verbs may only agree with internal arguments (à la Meir, 1998), since neutral verbs in DGS *can* agree with (animate) external arguments in unergative constructions.

The results in this section provide the basis for a theoretical analysis in Chapter 8.2.3, in which I propose that neutral verbs agree with both their arguments, if present, but that they are phonologically constrained from expressing agreement with more than one argument.

5.3.4 Subject-drop patterns

In Chapter 4.3.3, I hypothesized that null non-first person subjects are not allowed in clauses with body-anchored verbs due to an iconically motivated association between the body and first person – a prediction that was largely borne out. If it is really a property specific to body-anchored verbs that forces such a restriction, then neutral verbs should show different behavior with respect to subject drop. In this section, I investigate whether that is the case.

For all examples with neutral verbs, annotations were made indicating information about the subject referent in the construction. For each example, specifications for person (1/2/3), plurality (\emptyset /pl), overtness (O/N), and presence of role shift in the clause (\emptyset /rs/qrs) were combined to form a single label, e.g. 1Nrs. In clauses with quotative role shift (qrs), the person value was determined based on the person of the subject within the quotation, which may be first, second or third. This subject can be overt in the clause. In clauses with action role shift (rs), on the other hand, the subject in the global context determined the annotation value for person. The reason for that is that the local interpretation of the subject necessarily corresponds to the signer, i.e. first person, since it is the signer who represents another referent's actions. This is why I hypothesized in Chapter 4.3.3 that the constraint on subject drop may be lifted when there is action role shift in the clause: non-first person subjects in the global context are interpreted as

first-person subject in the local context of the role shift.

In the analysis, I collapsed singular and plural subjects into the same category because only very few subjects are clearly marked as plural, and plurality is not expected to have an impact on the results. Examples without role shift and with role shift of the quotative kind are also grouped together. Constructions with weather verbs are not included in the analysis, since these verbs do not take any arguments.

Table 5.10: (a) Overt and (b) null subjects in clauses with neutral verbs (N=181) in DGS; rs = role shift.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	40	7	First	33	3
Second	6	0	Second	4	0
Third	61	4	Third	20	3

As Table 5.10 shows, there are hardly any examples with second-person subjects, although it is clear that both overt (N=6) and non-overt (N=4) subjects are allowed. Three of the constructions with a null subject are interrogatives; the other construction is a hortative.

First-person subjects, with or without role shift, are overt in 47 cases and null in 36 cases. Of the examples with third-person subject referents, 65 include an overt subject, while 23 examples involve a null subject. Notably, 20 of the examples with a null third-person subject do not include role-shift markers. This is important, because for those 20 cases without role shift, it cannot be argued that the local interpretation of the subject is first person rather than third person. As such, it can be concluded that third-person subject drop is allowed in constructions with neutral verbs – even in the absence of role shift. It should be remarked here that the distribution between overt and non-overt first- and third-person subjects is not equal, since overt third-person subjects are attested almost three times as often as null third-person subjects. Nonetheless, the findings for neutral verbs contrast starkly with those for body-anchored verb constructions but without role shift, where just 2% of all third-person subjects are null. Of the neutral verb constructions without role shift, almost 25% include a null third-person subject.

Of the intransitive clauses with a null third-person subject, three involve incongruence between the place of articulation of the neutral verb and the subject

locus. For these examples holds that subject drop cannot be licensed by localization. In addition, I showed in the previous section that transitive neutral verbs tend to align with the locus associated with the object rather than the subject. Furthermore, neutral verbs generally cannot be localized at the locus of the signer (i.e. first person), yet null first-person subjects frequently occur. I return to the issue of localization and subject drop, and their relation, in Chapter 8.3.4.

For the sake of illustration, three examples with null subjects are presented in (39). Example (39a) includes a non-overt first-person subject; examples (39b) and (39c) both include a null third-person subject. Note that in (39c), there is incongruence between the subject, which had previously been localized on the signer's left, and the verb, articulated at the center of the signing space.

- (39) a. MOST SCHOOL INDEX_a FOOTBALL **PLAY2** O V
 'Most of the time [I] play football at school.' [koe11-A-00:21.60]
- b. STILL **BURN** V
 '[The towers] were still burning.' [hh03b-A-02:11.15]
- c. re
 THEREFORE **DIE1** \ FEEL FOR AREA BIG SHOCK # S V
 'So when [he] died, it was a huge shock for everyone.'
 [koe18-A-00:31.45]

5.4 Summary

This chapter presented a detailed description of the formational and morphosyntactic properties of neutral verbs, i.e. verbs that are articulated at or close to the center of the signing space in their citation form. I described a variety of iconic form-to-meaning mappings which recur across neutral verb forms; some of these mappings can also be attested among body-anchored verb forms. The use of handling handshapes, for instance, is common for verbs of both types (and, as will be shown in Chapter 6.2, is also witnessed in some agreeing verbs).

I argued that the place of articulation of neutral verbs is not in itself iconic, but it becomes potentially meaningful when combined with the – generally iconically motivated – phonological specifications for handshape and movement. In the case of a form with a handling handshape, for instance, the place of articulation may become associated with the location of the object manipulated by the signer's hands.

In general, a split can be observed between neutral verb forms that make iconic reference to one event participant, and forms that iconically represent two arguments. However, it is not necessarily the case that forms referencing two arguments (can) participate in transitive constructions, and forms referencing one argument are intransitive. For instance, the verb form BE-DRY3 makes iconic reference to both an agent and a patient, yet this form can only be used in intransitive constructions. Thus, iconic properties of neutral verbs do not necessarily determine argument structure.

In terms of constituent order, the most notable finding is that (transitive) neutral verbs prefer a preverbal object, while for those verbs that may occur with locative constituents, the preferred position of the locative is after the verb.

Neutral verbs form a mixed group in terms of valency: there are intransitive, transitive, and ditransitive neutral verbs, and weather verbs do not take any arguments at all. Some neutral verbs participate in the causative-inchoative alternation, while others participate in the unspecified-object alternation.

With respect to localization properties, the following generalizations appear to apply:

- (i) if the internal argument in transitive constructions, or the sole argument in intransitive constructions, is *animate*, it tends to be localized on the signer's left or right, and the verb usually (albeit not always) localizes at the same location;
- (ii) if the internal argument in transitive constructions is *inanimate*, there is a strong tendency for it to be localized at the center of the signing space, with the verb usually following suit – unless a direct contrast is set up between two internal arguments, in which case both arguments as well as the corresponding verbs are localized at other locations in the signing space;
- (iii) neutral verbs in transitive constructions do not localize at the place of articulation associated with the external argument.

These generalizations are similar to what Meir (1998) has described for ISL, with two nuances. Firstly, Meir (1998) mentions a number of examples with inanimate objects that are localized at a non-neutral position in the signing space, explicitly stating that such examples are also possible in non-contrastive contexts. However, both the corpus data and the discussions with informants indicate that in DGS, inanimate arguments resist localization. Secondly, neutral verbs in DGS

may align with external arguments as long as there are no internal arguments in the clause, while Meir (1998) argues that localization consistently occurs at the locus of the internal argument only.⁴¹

Finally, I have shown that subjects of all persons, and independent of the presence of role-shift markers, may be dropped in clauses with neutral verbs. Subject drop may also occur in constructions where the place of articulation of the neutral verb is incongruent with the locus associated with the (null) subject.

In Chapter 8, I expound on how the results reported in this chapter may be accounted for from a theoretical perspective. In the next chapter, I discuss the properties of agreeing verbs.

⁴¹I should reiterate that the internal or external status of an argument is based on its thematic role and has not been verified by means of syntactic tests. Additional research is necessary to find further support for the hypothesis that neutral verbs may align with any argument – independent of its syntactic status – in intransitive constructions.

CHAPTER 6

Agreeing verbs

THIS chapter is the last of three which detail the properties of a specific verb type in German Sign Language (DGS); it is faithful to the same structure as Chapters 4 and 5 to optimize the conditions for comparison in Chapter 7.

Agreeing verbs are characterized by their ability to modify their path movement and/or orientation as a means to express what many have argued is agreement marking (see e.g. Lillo-Martin & Meier, 2011; Padden, 1988; Pfau et al., 2018; Rathmann & Mathur, 2008, to name a few). Depending on properties of the verb and/or its arguments, agreement is said to occur with person (and number) or location.¹ However, even a fleeting glance at the literature instantly reveals that an analysis of such verbs in terms of agreement faces significant challenges, and therefore the debate as to how to best analyze these verbs is still very much ongoing. In this and the next chapters, I add my own voice to the discussion, basing my perspective on a detailed analysis of the properties of agreeing verbs in the DGS corpus data, as discussed in this chapter.

A concise overview of previous studies on agreeing verbs in sign languages is presented in Section 6.1. Section 6.2 describes the formational properties of the agreeing verbs in the data and identifies recurring iconic form-to-meaning mappings. In Section 6.3, the morphosyntactic properties of agreeing verbs are examined, with constituent order preferences, valency patterns, agreement properties and subject-drop patterns all addressed in turn. Section 6.4 presents a summary of the main findings and builds up to the formal analysis in Chapter 8.

6.1 Background

Out of the three verb types examined in this dissertation, agreeing verbs have – without question – been discussed the most in the sign language literature. Studies in this domain have been so plentiful that several comprehensive overviews on the agreement debate have recently appeared; see e.g. Mathur and Rathmann (2012) and Costello (2015) but also Lillo-Martin and Meier (2011) and commentaries. I therefore aim to keep this section relatively brief, and merely introduce and discuss the concepts and theories that are pertinent to the purposes of this dissertation. I refer the interested reader to the works cited above for more ex-

¹One of the aims of this chapter is to determine whether the grouping together of verbs that agree with person, i.e. regular agreeing verbs, and verbs that agree with location, i.e. spatial verbs (de Quadros & Quer, 2008; Janis, 1992, 1995), is justified on the basis of their formational and morphosyntactic properties.

tensive overviews.

Section 6.1.1 discusses the different subtypes of agreeing verbs which have been described in the literature and categorizes the verbs in the DGS corpus data accordingly. This descriptive part offers a glance of the complexity of the phenomenon under discussion and introduces the biggest theoretical challenges. Section 6.1.2 discusses different approaches toward resolving these challenges and chiefly pays attention to the arguments that have been put forward in the literature for or against an analysis of agreeing verbs in terms of agreement.

6.1.1 Different kinds of agreeing verbs

A prototypical agreeing verb is characterized by a path movement that can be modified such that it starts at the locus associated with the verb's subject, and ends at the locus associated with the verb's object. With ditransitive verbs, the object that gets marked is the thematic recipient, which is analyzed as an indirect object in this dissertation (see Chapter 2.3.2.2). As such, the mechanism exploited to express agreement is spatial in nature.² An example of a prototypical agreeing verb in DGS is TEACH (Figure 6.1). In Figure 6.1a, the path movement of TEACH starts from one third-person locus and ends at another.³ In Figure 6.1b, there is movement from a third-person locus to the first-person locus (the signer). In both cases, the path movement goes from subject to (indirect) object. In addition to the movement trajectory, the orientation of the hands is modified such that they face away from the subject locus and face toward the object locus. Indeed, some verbs have been described for various sign languages which do not have a path movement but exclusively use orientation change to mark agreement (see e.g. Friedman, 1975; Meir, 1998; Valli & Lucas, 1992). None of the agreeing verb forms in the data extracted from the DGS Corpus are of this kind.

There are several other types of agreeing verbs that deviate from the prototypical pattern. Firstly, some verbs – which have been dubbed 'backward verbs' in the literature (see e.g. de Quadros & Quer, 2008; Friedman, 1975; Meir, 1998; Padden, 1988; Shepard-Kegl, 1985) – show reverse directionality: their path movement goes from object to subject rather than the other way around. An example

²See Section 6.1.2 for alternative views on the grammatical status of this mechanism. For convenience, I continue to use the term 'agreement' in this section.

³Loci in the signing space are indicated with letter subscripts, with the first locus in an example being assigned the letter 'a', the second locus 'b' and so on. The locus of the signer is indicated with '1'. See Notation conventions for a full list of conventions.



Figure 6.1: Two instances of the agreeing verb *TEACH* with path modification.

from the DGS data is the verb *TAKE1* (Figure 6.2). Backward verbs pose a significant challenge in the attempt to characterize directionality in terms of (syntactic) agreement, as they can be taken as counterevidence against the perspective that agreeing verbs in sign languages mark syntactic relations. Theoretical proposals that have been put forward to resolve the issue are discussed in Section 6.1.2.



Figure 6.2: An instance of the backward agreement verb *TAKE1* with path modification.

Secondly, some verbs are able to express agreement with their object but have a fixed initial (or, in the case of backward verbs, final) place of articulation on the body. The backward verb *HUG1* (Figure 6.3), for instance, starts at the locus associated with the object and consistently ends its trajectory at the signer's body – independent of who the subject referent is. As I discussed in Chapter 3, I treat these kinds of verbs as hybrids between body-anchored verbs and agreeing verbs.

Thirdly, some linguists have analyzed the localization of what I call neutral verbs as single-argument agreement (e.g. Costello, 2015; Lourenço, 2018; Lou-



Figure 6.3: An instance of the hybrid and backward verb HUG1, which has a fixed final place of articulation on the body.

renço & Wilbur, 2018). Since I already discussed this verb type extensively in Chapter 5, let me just reiterate that analyses which view localization as agreement may move in one of two possible directions: either the agreement mechanism employed by agreeing verbs and neutral verbs is considered to be distinct, or it is regarded as the same. Indeed, the literature has witnessed proponents of either perspective; my own view on the matter is discussed in Chapter 8.2.3.

Finally, Padden (1988, 1990), and many others in her wake, have traditionally made a distinction between spatial verbs and agreeing verbs by arguing that the former take locative affixes while the latter express grammatical agreement with their arguments in person and number. However, others have contended that the mechanism that is employed is actually the same for the two types of verbs (e.g. de Quadros & Quer, 2008; Janis, 1992); see Section 6.1.2.2 for more discussion.

While the different types of agreeing verbs discussed here can display agreement marking in one way or another, another puzzling property of the agreement system is that agreement marking has been claimed not to be obligatory in many sign languages (see e.g. Bahan, 1996; Liddell, 2003; Meier, 1982; Padden, 1988, for American Sign Language (ASL); Meir et al., 2007, for Israeli Sign Language (ISL); Engberg-Pedersen, 1993, for Danish Sign Language (DTS); Costello, 2015, for Spanish Sign Language (LSE); Pizzuto, 1986, for Italian Sign Language (LIS); de Beuzeville et al., 2009, for Australian Sign Language (Auslan); Schuit, 2013, for Inuit Sign Language; Fenlon et al., 2018, for British Sign Language (BSL); Lege-land, 2016, for Sign Language of the Netherlands (NGT)). This is another matter I return to in the next section.

Furthermore, as discussed in Chapter 3, agreeing verbs tend to share a com-

mon semantics. Meir (1998, 2002) argues that agreeing verbs express concepts of transfer; I suggested that they express an interaction. In any case, the apparent connection between semantics and agreement morphology in sign language has puzzled (sign) linguists for quite some time, as it is a correlation not often witnessed in spoken languages.

Table 6.1 lists all the agreeing verb forms in the DGS corpus data, and specifies their subtype in case they are not prototypical forms. Verbs are classified as spatial when the corpus examples containing them suggest that at least one of the loci can be construed as consistently having a locative interpretation. For instance, the final place of articulation of GO can be interpreted as corresponding to a particular location, such as a city. In the subsections within Section 6.3, the similarities and differences between regular agreeing verbs and spatial verbs are routinely addressed.

Table 6.1: Agreeing verb forms (N=24) in the DGS corpus data with specification of their subtype; no specification means prototypical agreeing verb.

Verb form	Specifications	Verb form	Specifications
BEAT		SEE	hybrid
BRING	spatial	SEND1	spatial
FOLLOW		SEND2	
GIVE		SHOW	
GO1	spatial	SMELL1	hybrid; backward
GO2	spatial	TAKE1	backward
HELP1		TAKE2	backward
HELP2		TEACH	
HUG1	hybrid; backward	TELL2	
KILL		TELL3	hybrid
LEAVE	spatial	THROW	spatial
LOOK-AT2		TOUCH	

6.1.2 Theoretical approaches toward agreement verbs

In the previous section, I have introduced some of the theoretically challenging aspects of the verb agreement system in sign languages. Indeed, the number and nature of the non-canonical properties of the system have led some researchers to conclude that there is no grammatical agreement at all in sign languages. I briefly review some of the main arguments against an agreement approach in Section

6.1.2.1 before moving on to the accounts that do consider the modification of the path movement of agreeing verbs to be an expression of agreement in Section 6.1.2.2. Each of these analyses is able to solve some of the puzzles introduced in the previous section, although none can account for every problem equally successfully.

6.1.2.1 Agreement or not?

Although, since Padden's (1988) seminal work on ASL, many sign linguists have supported an agreement analysis of directional verbs, there has also been an increase in agreement scepticists in recent years. The most prominent detractor is Liddell (1995, 2000, 2003, 2011), but his views are echoed and expanded upon in, for instance, Johnston and Schembri (2007) and Schembri, Cormier, and Fenlon (2018).

Central to the perspective shared by these authors is the notion that agreement verbs *indicate* rather than agree with their arguments. Liddell (1995 and later work), who works within a Cognitive Grammar framework, argues that 'indicating verbs' involve the incorporation of a pointing gesture. Like pronominal pointing signs, indicating verbs come with a specification in the mental lexicon that they need to be directed at a (present or imagined) referent. The direction of a pointing sign or verb with incorporated pointing, then, depends on "the locations of things in real space or in real-space blends [signing space representing real space]" (Liddell, 2003, p. 355). As such, there are no grammatical features associated with loci in space according to Liddell and others adopting the same perspective: directionality is not constrained by grammatical rules but mediated by a more general cognitive capacity equally available to gesturing speakers.

The advantage of such an approach is that it can deal with some of the non-canonical properties of agreeing verbs in a rather straightforward way. For instance, the fact that agreement marking only occurs with a subset of verbs with an apparent shared semantics becomes trivial, since there is no longer an agreement phenomenon to speak of. In addition, the question of what controls 'agreement' in sign languages (see Section 6.1.2.2) no longer requires a complicated answer: the controller simply is "the mental representation of the spatial location of the referent" (Schembri et al., 2018, p. 20).

Another issue that becomes inconsequential under an indicating approach is the apparent optionality of agreement marking in sign languages. As pointed out

earlier, it has been noted for many sign languages that agreement marking of at least the subject is optional (see e.g. Engberg-Pedersen, 1993; Meir et al., 2007; Padden, 1988); in some cases, it has even been argued that both the subject and object are optionally marked (e.g. de Beuzeville et al., 2009; Fenlon et al., 2018; Legeland, 2016; Schuit, 2013).

In two extensive corpus-based studies, de Beuzeville et al. (2009) and Fenlon et al. (2018) investigate the degree of optionality of agreement marking in Auslan and BSL, respectively. The results in these two studies are comparable, with agreeing verbs occurring in unmodified form in approximately 30% of the examples in their data. Fenlon et al. (2018) additionally calculate the rate of modification to align with the agent vs. patient arguments for each verb token. They show that agent alignment occurs in 65% of their examples. This percentage includes 38% of ‘congruent’ cases, in which there is no phonological difference between the citation form and the agent-marking form of the verb (e.g. in constructions with a first-person agent and a prototypical agreeing verb form). Patient marking also occurs 65% of the time (with 13% congruent cases). Verbs are unmodified for agent or patient marking in respectively 31% and 26% of the examples in the BSL corpus data.⁴ Furthermore, Fenlon et al. (2018) show that modification of verbs is disfavored when neither the agent nor the patient is represented by the signer him- or herself, coupling this finding to the observation that the presence of role shift, when the signer takes on the perspective of another referent, is a strong predictor of verbal modification. The authors conclude that the patterns of modification in the data reflect that “signers are conceptualizing events from an egocentric perspective”, which they take as support for the claim that agreeing verbs represent a “fusion of morphemic and deictic gestural elements” (Fenlon et al., 2018, p. 111).

The trade-off of rejecting a rule-based grammatical account is that any kind of systematicity that does not seem to arise from any general cognitive capacity cannot easily be explained. It also does not follow that the presence of gestural or iconic elements in language obviates the need for linguistic rules altogether (see e.g. Wilbur, 2003, and later work, Schlenker et al., 2013, Schlenker, 2014, and Oomen, 2017, for demonstration of the contrary). The studies discussed in the next section all take the idea that agreeing verbs express grammatical agreement

⁴The remaining 4% and 10% of the examples are annotated as ‘indeterminate’ because it could not be determined whether the verb was modified or not. This was frequently due to participants’ seating arrangements with respect to the camera.

seriously, and have presented a variety of arguments in support of that view.

6.1.2.2 Agreement accounts

Proponents of an agreement analysis of agreeing verbs (e.g. Aronoff et al., 2005; Cormier, Wechsler, & Meier, 1998; Fischer & Gough, 1978; Janis, 1995; Lillo-Martin & Meier, 2011; Padden, 1988) consider the arguments of these verbs to be the controllers of agreement; most of them additionally posit that the controller shares person features (and potentially also number features) with its target, the verb. But such an analysis raises questions about the exact nature of these person features, given that non-first person referents are associated with particular locations in the signing space within the context of a discourse.⁵ That is, a referent locus picks out a specific referent rather than the pool of all possible referents available within a discourse that a third-person pronoun would pick out in spoken languages.⁶ Conversely, the same referent can be associated with different loci in different conversations.⁷ Compare this to the situation in spoken languages, where the same referent will consistently be referred to with the same pronoun – and thus also the same agreement marker – provided the syntactic conditions are the same.

Lillo-Martin and Klima (1990) propose that noun phrases in sign languages are associated with a referential index (R-index), which is an abstract variable that receives its value from the discourse. The index may be realized overtly as a locus (R-locus), which can be basically any location in the signing space, i.e. there is an infinite number of possible R-loci. As it is therefore impossible for these loci to be individually listed as morphemes in the mental lexicon, this issue is sometimes referred to as the 'listability problem' in the literature, and it has been regarded as one of the key arguments against the grammatical status of agreement (see e.g. Schembri et al., 2018).

Advocates of an agreement account have offered various solutions to the lista-

⁵As Lillo-Martin and Meier (2011) discuss at length, adding to a list of arguments first provided in Meier (1990), first-person pronominal forms are demonstrably distinctive, and first-person marking by agreeing verbs also displays idiosyncrasies.

⁶This observation is one of the reasons some researchers, such as Costello (2015), Keller (1998), and Steinbach and Onea (2016), have proposed features other than person. Steinbach and Onea's (2016) account plays an important role in the formal analysis in Chapter 8.2.

⁷In fact, loci assigned to referents may even change within a discourse, e.g. under role shift.

bility problem; here, I briefly mention two. Firstly, Lillo-Martin and Klima (1990) suggest that R-loci need to be distinguished from their (abstract) R-indices, which *are* listable and thus do not suffer the same defect. Still, that leaves open the question of what the grammatical status of these R-loci is; Lillo-Martin and Meier contend that these must still have a gestural component, concluding that “abstract indices are part of the grammar, but loci are determined outside of grammar” (2011, p. 121). Various accounts of agreeing verbs build upon the R-locus analysis by Lillo-Martin and Klima (1990) by proposing a copying or sharing mechanism of the person (and number) values of R-indices to instantiate verb agreement in sign languages (e.g. Aronoff et al., 2005; Cormier et al., 1998; Lillo-Martin & Meier, 2011).

Secondly, Steinbach and Onea (2016) offer a slightly different solution to the listability problem. In their framework, R-loci – which are proposed to be regions in the signing space – are always introduced in opposition to previously introduced regions. As such, there is no infinite number of loci that need to be stored in the lexicon; only the “necessary delimitations of the corresponding regions” (Steinbach & Onea, 2016, p. 421) need to be introduced into the grammar.

But there are more challenges for agreement accounts. One phenomenon that has received considerable attention in the literature is that of backward verbs. The reason is evident: if there are agreement verbs that display object-to-subject movement in addition to verbs that involve subject-to-object movement, then that would suggest that semantic factors are at play and, as such, that agreement in sign languages cannot be a purely syntactic phenomenon. This deliberation has led some (e.g. Bos, 1998/2017; Friedman, 1975; Meir, 1998, 2002; Shepard-Kegl, 1985) to propose thematic or hybrid analyses which integrate the idea that the movement trajectory of an agreeing verb – be it a backward verb or not – goes from source to goal rather than from subject to object.⁸

Meir (1998, 2002), for instance, proposes on the basis of ISL data that there are two types of agreement marking that are independent from each other yet are articulated simultaneously. The agreement verb’s path movement – analyzed as a morpheme labeled DIR – indicates direction of movement from source to goal (in accordance with analyses proposed by Bos, 1998/2017; Friedman, 1975;

⁸Yet, other researchers have pointed out that the agreement mechanism cannot be entirely thematic in nature. Padden (1988), for instance, observes that only subject marking can be omitted on agreeing verbs in ASL. As such, she concludes, the syntactic categories of subject and object must factor into the agreement process somehow.

Shepard-Kegl, 1985, and others). The facing of the fingertips or palm of the hand is toward the object, which is thematically the goal or recipient. Meir (1998, 2002) proposes that facing functions as a dative affix.⁹

Although Meir's (1998, 2002) analysis provides a unified account of both regular and backward verbs, it also presents new challenges. De Quadros and Quer (2008), for instance, note that there are many instances of agreeing verbs that are simple transitives which take a theme or patient argument rather than a goal argument. As such, they argue, a source-goal analysis cannot account for all verbs. In addition, the authors show that auxiliaries in the languages they investigate, Brazilian Sign Language (Libras) and Catalan Sign Language (LSC), always have a path movement from subject to object – even when they are combined with backward verbs – which they take as a strong argument for a syntactic analysis of path movement. De Quadros and Quer (2008) propose that the reason backward verbs in LSC as well as other sign languages show reverse directionality is that they are actually lexicalized handling verbs which agree with locations rather than arguments. Thus, they argue that backward verbs should be treated as a separate class of verbs.

Many of these arguments are echoed in a recent article by Pfau et al. (2018), who additionally point out that Meir's account cannot deal with cross-linguistic variation or diachronic change in verb type. If thematic relations determine the direction of movement in agreeing verbs, then verb forms denoting the same meaning in different sign languages should be of the same type, yet there are plenty of examples that show this is not the case. I refer the reader to Pfau et al. (2018) for a discussion of a number of other issues for Meir's analysis.

Pfau et al. (2018) present a different solution to the problem of backward verbs than de Quadros and Quer (2008) and propose that they display ergative agreement. As such, they consider agreement in sign languages to be a fully syntactic process. Pfau et al.'s (2018) formal analysis utilizes modality-independent mechanisms – indeed, ergative agreement is also attested in spoken languages – although they claim that it is the way in which they are combined that is modality-specific. I return to Pfau et al.'s (2018) account of backward verbs in Chapter 8.2.2.1; see that chapter for further details.

⁹As stated in Chapter 2.3.2.2, verbal arguments which, on semantic grounds, can be classified as recipients in the DGS corpus data are labeled O2 for indirect object, thus aligning with Meir (1998, 2002) in this respect. However, I will not adopt Meir's view that facing marks dative case in the formal analysis in Chapter 8.

In their article, de Quadros and Quer (2008) address another frequently raised question in connection to agreeing verbs: should spatial verbs be treated as a sub-type of agreeing verbs or rather as a separate category? De Quadros and Quer (2008) show that the boundary between agreeing and spatial verbs is fuzzy, as some verbs agree both with person as well as with locations. The examples in (1) from Libras (de Quadros & Quer, 2008, p. 539) illustrate their point.¹⁰

- (1) a. $loc.a+1$ CARRY $loc.b$ [Libras]
 'I carry it (from here) (to there).'
- b. $*_{loc.a}$ CARRY $loc.b$ [Libras]
 '(He) carries it from here (a place that does not coincide with the subject) to there.'

In (1a), the verb CARRY moves from a locus that is simultaneously associated with a location (the place from which the object is carried), and a subject, which is first person. In (1b), the place of articulation from which the verb starts its trajectory also corresponds to the starting location of the object. Crucially, however, it does not align with the locus which had become associated with the third-person subject referent earlier in the discourse (not displayed). As it turns out, (1b) is ungrammatical. de Quadros and Quer (2008) argue that this ungrammaticality arises because null subjects in Libras, as in other sign languages, are licensed by agreement marking (de Quadros, 1999). In (1a), the initial place of articulation of the verb coincides with that of the subject, thus obviating the need for an overtly realized subject – at least when this verb alignment is analyzed as an expression of agreement marking. In contrast, an overt subject is required in (1b), because there is a disjunction between the place of articulation of the subject and the initial location of the object being carried. As a result, there is nothing in the sentence that can license the subject, thus leading to ungrammaticality. For the sentence to be grammatical, either an overt subject needs to be present, or the initial location of the verb needs to coincide with the subject's R-locus.

This and several other observations lead de Quadros and Quer (2008) to conclude that agreeing and spatial verbs constitute a single category. Their analysis is close in spirit to Janis's (1992, 1995), who also does away with the distinction

¹⁰In order to avoid confusion, I slightly adapted de Quadros & Quer's glosses, as they use single letter subscripts to refer to locations, while I (also) use those subscripts to indicate referent loci.

between spatial and agreement verbs.¹¹

A final issue which merits further discussion is that agreement marking of the subject has been claimed not to be obligatory in many sign languages (see e.g. Bahan, 1996; Liddell, 2003; Meier, 1982; Padden, 1988, for ASL; Meir et al., 2007, for ISL; Engberg-Pedersen, 1993, for DTS; Costello, 2015, for LSE; Pizzuto (1986), for LIS), and four other sign languages have been reported to allow optional marking of both arguments (see de Beuzeville et al., 2009, for Auslan; Fenlon et al. (2018), for BSL; Legeland, 2016, for NGT; Schuit, 2013, for Inuit Sign Language). These observations raise two fundamental questions: why is subject and/or object marking optional, and why is object marking but not subject marking obligatory in some sign languages? These questions have proven to be rather elusive, although the literature offers some suggestions.

Costello (2015) offers that unmodified instances of agreement verbs are simply null forms that take a default value. As such, the obligatoriness of agreement – a core canonical property of agreement in spoken languages (Corbett, 2003, 2006) – still holds at an underlying syntactic level. It seems that such an analysis is in principle extendable to sign languages with optional object marking, as well. Pfau et al. (2018) propose an impoverishment rule which optionally deletes the features of the subject on the verb. This analysis appears equally applicable to sign languages which optionally mark objects as well as subjects.

For sign languages in which only subject marking is optional, Meir et al. (2007) suggest that the subject is actually marked by means of a basic lexicalization strategy which they coin ‘body as subject’ (see also Chapter 4.1.1). Body-anchored verbs mark subjects in this way by default, while this standard pattern becomes obscured through person marking in the case of agreeing verbs. However, once the agreement mechanism is not instantiated for whatever reason, ‘body as subject’ gets reactivated, such that the subject is once more represented by the body rather than through directionality. The theoretical analysis I propose in Chapter 8.2 is quite close in spirit to Meir et al.’s; I return to their account there.

¹¹According to Janis (1992, 1995), agreement in sign languages is controlled by the case of a verb’s arguments rather than their thematic role.

6.2 Agreeing verb forms

In this section, I describe recurring iconically-motivated lexicalization patterns in agreeing verb forms, including spatial forms.¹² As mentioned previously, semantics is known to govern to some extent whether a verb gets realized as an agreeing form, with the most obvious semantic requirement being that agreeing verbs should denote events involving (at least) two participants. Meir (1998, 2002) has additionally suggested that agreeing verbs denote transfer, while e.g. Friedman (1975) has cited the reverse path movement of backward verbs as evidence that agreeing verbs move from source to goal. In this section, I identify recurring iconic form-to-meaning patterns to establish whether the semantic characteristics mentioned in the literature are consistently reflected in agreeing verb forms in an iconic manner, and if so, how.

6.2.1 A classification of agreeing verb forms

Figure 6.4 presents three verb forms that illustrate different iconically-motivated lexicalization strategies. *KILL* (Figure 6.4a) is articulated with a handling handshape referencing the handling of a weapon such as a knife. It also involves a path movement, which maps onto the movement of the hand in a stabbing act. *TELL2*, presented in Figure 6.4b in modified form, is another verb in which hands map directly onto hands. However, the movement of the hands does not represent the manipulation of an object but simply the way the hands move, in this case, when a person is signing. Finally, the spatial verb *GO2* (Figure 6.4c) involves a path movement, which may be said to indicate a direction, but there is no clear iconic mapping between the handshape and a particular semantic aspect of the event the verb denotes.

As it happens, the form-to-meaning mappings demonstrated by the verb forms described above are also attested among body-anchored verbs and/or neutral verbs (see Chapters 4.2 and 5.2). More specifically, several body-anchored as well as neutral verbs involve handling handshapes, a number of body-anchored verbs involve hands representing moving hands, and some neutral verbs forms involve abstract handshapes, yet have an iconic movement. I found two other recurring

¹²It will transpire from the discussion in this section that spatial verb forms do not distinguish themselves from regular agreeing verb forms in terms of iconic mappings. However, as will be shown in Section 6.3, there are several morphosyntactic properties that distinguish spatial verbs from regular agreeing verbs.

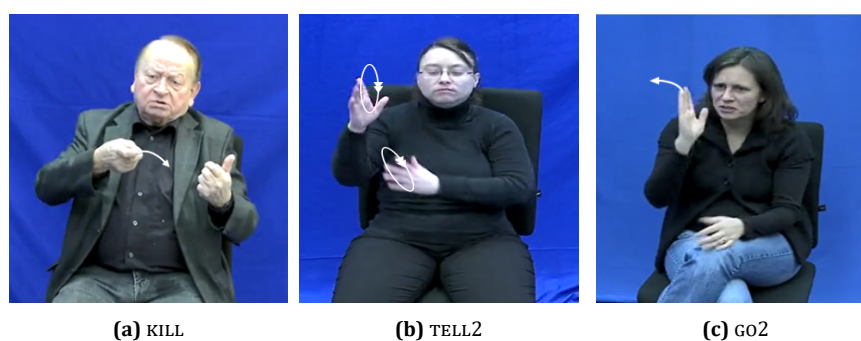


Figure 6.4: Three examples of agreeing verb forms in DGS illustrating different form-to-meaning patterns.

mapping patterns for agreeing verbs; these are introduced below. In both cases, the types of mappings are also familiar from body-anchored and/or neutral verb forms.

Distinguishing agreeing verb forms from body-anchored and neutral forms is their phonological specification for movement. Typically, this is a path movement, although some forms have a different kind of movement specification. An example is TELL2, which involves a circular movement (see Section 6.2.2.2).¹³ These different types of movement have in common that they indicate a direction. That is, they iconically reflect (metaphorical) movement from some location *a* to some location *b*.

To say that the movement specification in agreeing verbs maps onto ‘direction’ is, I believe, the most neutral way to characterize the iconic mapping that distinguishes agreeing verbs from other verb types. ‘Path’ or ‘trajectory’ does not capture the fact that not all agreeing verb forms involve a path movement, while ‘transfer’ implies all sorts of semantic properties, such as the presence of an entity being transferred and the presence of an entity carrying out the transfer. Although such readings are possible for some agreeing forms, e.g. those involving a handling handshape, they are not appropriate for all forms. Furthermore, one would need to take the other phonological specifications into account to arrive at such a multi-faceted mapping, while I am attempting to identify which mean-

¹³It is also possible for agreeing verbs to lack a clear movement while involving an orientation change, although no such examples were attested in the data set. Nonetheless, such forms have in common with other agreeing verb forms that they mark out a particular direction.

ing the movement specification alone iconically maps onto. ‘Direction’ arguably applies to all agreeing verb forms, including spatial verbs (see Section 6.2.2 for a discussion of individual forms).

Table 6.2 presents the categorization I propose for agreeing verb forms. Categories I (hand(s) holding), II (hand(s) moving), and V (iconic movement) have already been introduced above. Beyond these three categories, I distinguish two other categories on the basis of handshape, although they include just a couple of forms. Two verb forms in category III involve the dominant hand representing body parts of perception, and one verb form in category IV is articulated with a whole-entity handshape. Handshapes representing perception body parts are also attested in some body-anchored verb forms (Chapter 4.2.2.6), while some neutral verb forms involve whole-entity handshapes (Chapter 5.2.2.3).

Table 6.2: A categorization of agreeing verb forms (N=24) in DGS based on iconic mapping patterns.

Cat. #	Movement	Hand(s)	#
I	direction	hand(s): holding	12
II		hand(s): moving	3
III		body part: perception	2
IV		whole entity	1
V		iconic movement	6

In the next section, I discuss the five categories in more detail. In Section 6.2.3, I investigate whether the verb forms of the different categories cluster on the semantic map from Chapter 3 in any meaningful way.

6.2.2 Iconic mapping patterns

The categories introduced in the previous section are discussed with examples in the following subsections.

6.2.2.1 Category I

Category I forms the largest group of agreeing verb forms (N=12) and includes forms with handling handshapes, which iconically represent the holding or handling of an entity. In some cases, the verb form references the handling of an instrument (e.g. KILL, BEAT), while in others, iconic reference is made to the direct

manipulation or holding of an entity by the hand(s) (e.g. HUG1, TOUCH). All category I forms are listed in (2); Figure 6.5 depicts three examples.

(2) **Category I** | hand(s): holding

BEAT, BRING, GIVE, HELP2, HUG1, KILL, SEND2, TAKE1, TAKE2, TEACH, THROW, TOUCH



Figure 6.5: Three category I agreeing verb forms, in which the hand(s) represent hand(s) holding an entity.

The use of a handling handshape suggests the presence of (at least) an agentive referent who is doing the handling as well as a patientive entity being handled. As proposed in the previous section, the movement, which is generally a path movement, indicates a direction. The use of the handling handshape enriches this general iconic mapping: the hand(s) move(s) from *a* to *b*. The initial and final locations of the verb forms are similarly supplied with additional iconic meaning through the use of a handling handshapes, mapping onto the initial and final locations of the hand(s), respectively.

Since the use of a handling handshape implies that there is also an object being handled, could it additionally be posited that the location and movement spec-

ifications map onto the initial/final locations and direction of the handled entity, too? Although this mapping works for some verbs, such as BRING, HELP2, and GIVE, it does not apply to all category I forms. A verb such as TOUCH (Figure 6.5a), for instance, involves a path movement – yet it is unlikely to be the case that the touched object moves along with the handling referent. It appears that the hand-internal change in aperture, resulting in the thumb and fingers making contact at the end of the path movement, iconically signals that the handling event only begins upon completion of the path movement, i.e. at the final place of articulation. With forms such as THROW (Figure 6.5b) or SEND2, the path movement also does not completely map onto the movement of the handled object. Rather, it represents the trajectory of the hand(s) holding and then releasing an object, as indicated by the change in aperture of the handshape from closed to open. The thrown/sent object's path extends beyond the final place of articulation of the form.

There also does not necessarily have to be a mapping between the movement and location specifications of the agreeing verb and the referent represented by the handling handshape. Consider the backward verb TAKE2, for instance (6.5c). A referent could physically move to take a particular object from a particular location to another, but this is not a requirement: the referent's arm might simply extend to take an object and then pull in again toward the body. Both possibilities would be represented by a verb with a handling handshape plus path movement, since a signer generally would not actually move to represent the movement of a referent. TAKE1 and HUG1 – also backward verbs – are similar to TAKE2 in this respect.¹⁴

The path movement in verbs such as KILL (Figure 6.4a), BEAT and TEACH can be associated with yet another entity, namely an instrument.¹⁵ The final place of articulation of these verbs can be associated with the referent affected by the instrument held by the handler, as well as the final location of the instrument.

Thus, there is a fair amount of variation in the type of entities or referents that may be associated with the path movement and initial and final locations of agreeing verb forms in category I. The common denominator across all these forms is that the path movement corresponds to the movement of the hands of an agentive referent from one location in the direction of another location. These

¹⁴For a discussion of complexities similar to those described here in classifier predicates in several sign languages, see Kimmelman, de Lint, et al. (2019), Kimmelman, Pfau, and Aboh (2019).

¹⁵In the case of TEACH the handled 'instrument' would be metaphorical and may be interpreted as knowledge.

observations are represented in the iconic mapping schema in Table 6.3.

Table 6.3: Iconic mapping for category I agreeing verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : handling	Hand(s) of animate (human) entity holding an entity
<i>Location</i> : initial location	Initial location of the hand(s)
<i>Location</i> : final location	Final location of the hand(s)
<i>Movement</i>	Hand(s) move(s) from the initial location in the direction of the final location

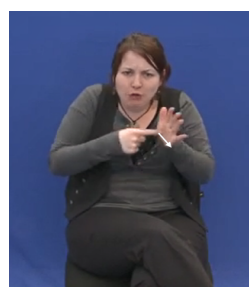
6.2.2.2 Category II

Category II includes verb forms in which the hand(s) represent hand(s) moving, but not handling an object. The three agreeing verb forms that are included in this category are listed in (3). TELL2 has previously been depicted in Figure 6.4b; SEND1 and SHOW are illustrated in Figure 6.6.

- (3) **Category II** | hand(s): moving
 SEND1, SHOW, TELL2



(a) SEND1



(b) SHOW

Figure 6.6: Two category II agreeing verb forms, in which the hand(s) represent moving hand(s).

The spatial verb SEND1 (Figure 6.6a) is articulated with a \uparrow -hand making a sweeping motion, imitating a gesture used in (some) hearing communities to send someone away.¹⁶ SHOW is articulated with the index finger of the dominant hand

¹⁶It is possible that the form is also used as a gesture in DGS, although I did not find the

pointing at the palm of the non-dominant hand. In this configuration, the hands make a path movement, mapping onto the forward directed movement of the hand(s) one might make when showing something to another person. Finally, TELL2 makes reference to signing. The verb does not involve a path movement but it has an asymmetric circular movement that may be reversed when the talker is a non-first person referent and the person being talked to is the signer (see Figure 6.4b).

Table 6.4 presents the iconic mapping schema for category II verbs that I propose based on the forms discussed above. The handshape represents the configuration of the hand(s) of an animate/human entity in motion. As a result, the initial place of articulation of the verb can be associated with the starting point of the hand(s) in the represented action, while the final location can be associated with the end point. The movement, then, represents the movement of the hands from the initial location in the direction of the final location.

Table 6.4: Iconic mapping for category II agreeing verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : hand(s) moving	Hand(s) of animate (human) entity moving
<i>Location</i> : initial location	Initial location of the hand(s)
<i>Location</i> : final location	Final location of the hand(s)
<i>Movement</i>	Hand(s) moves from the initial location in the direction of the final location

6.2.2.3 Category III

Category III agreeing verbs include just two forms: LOOK-AT2 (Figure 6.7a; presented in modified form) and SEE (Figure 6.7b). The forms involve the same handshape, but they differ in their orientation specification: LOOK-AT2 is articulated with the palm of the hand directed downward, while SEE is articulated with the palm directed toward the signer's face. SEE additionally differs from LOOK-AT2 in that its initial place of articulation is fixed on the body: it is a hybrid form (see Chapter 3.5.6).

verb to behave differently from other spatial verbs in terms of morphosyntactic properties; see the various subsections in Section 6.3 for details.

(4) **Category III** | body part: perception

LOOK-AT2, SEE

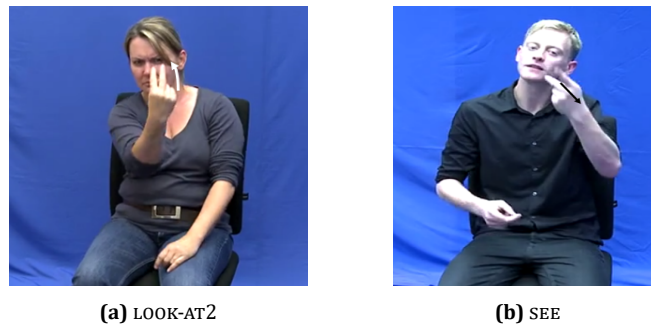


Figure 6.7: Two category III agreeing verb forms, in which the hand represent perception body parts.


Table 6.5 presents the iconic mapping schema for category III forms. Due to the signer’s hand representing eyes in both forms, the initial place of articulation becomes associated with the referent to whom the eyes belong, i.e. the perceiver. The final location can be said to correspond to the object of perception. The movement in the verb forms does not represent physical movement; rather, it represents the direction of eye gaze from the perceiver to the perceived.¹⁷

Table 6.5: Iconic mapping for category III agreeing verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> body part (perception)	Sensory organ perceives
<i>Location:</i> initial location	Perceiver
<i>Location:</i> final location	Perceived entity
<i>Movement</i>	Direction of perception: from perceiver to perceived

¹⁷Observe that the notion of ‘transfer’ (Meir, 1998, 2002) does not seem easily applicable to these verbs. One could argue that there is transfer of light enabling a referent to see – but in that case, the transfer would occur in the opposite direction. It is also decidedly odd to say that eye gaze would ‘transfer’ in some way. Eye gaze being ‘directed’ toward a location or referent certainly seems more appropriate. Also see Pfau et al. (2018, p. 16-17), who make a similar point.

6.2.2.4 Category IV

Category IV (5) includes just a single verb form: FOLLOW (Figure 6.8). The form is signed with two -handshapes, and, although these handshapes are not typically used to represent upright animate entities in DGS, it appears that this is what the handshapes iconically represent.

(5) **Category IV** | whole entity
FOLLOW

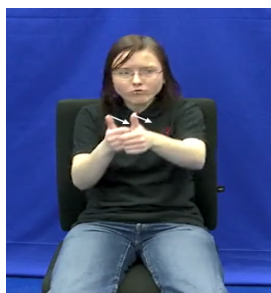


Figure 6.8: The category IV agreeing verb form FOLLOW, in which the hands represent whole entities.

My motivation for including a one-member category in the classification of agreeing verb forms is twofold. Firstly, FOLLOW does not fit in any of the other categories. Secondly, the use of whole-entity handshapes is also a strategy which is attested in some neutral verb forms (see Section 5.2.2.3).¹⁸

Table 6.6 presents the iconic mapping schema for category IV. The proposed mapping can only be tentative given that there is only one agreeing form in the category, but it seems sensible enough to suggest that the loci represent the beginning and end location of the movement of one or, as is the case with FOLLOW, two referents represented by the whole-entity handshape(s). The movement once more represents the direction of motion.

¹⁸Of course, another possibility is that FOLLOW should be analyzed as a classifier predicate. However, such an analysis seems implausible, as the handshape with which the form is articulated (i) is not used as a classifier handshape in DGS, as far as I am aware, and (ii) may not be substituted to refer to other types of referents, such as four-legged animals.

Table 6.6: Iconic mapping for category IV agreeing verb forms.

ARTICULATORS	SOURCE
<i>Handshape</i> : whole entity	Animate referent(s)
<i>Location</i> : initial location	Animate referent(s) start(s) movement at the initial location
<i>Location</i> : final location	Animate referent(s) end(s) movement at the final location
<i>Movement</i>	Animate referent(s) move from initial location in the direction of the final location

6.2.2.5 Category V

Category V agreeing verbs are the most abstract forms in the data set. The members of this category are listed in (6); three forms are depicted in Figure 6.9.

- (6) **Category V** | iconic movement
 GO1, GO2, HELP1, LEAVE, SMELL1, TELL3

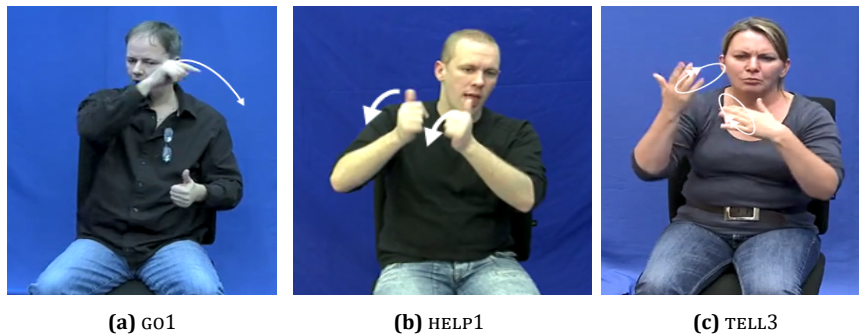



Figure 6.9: Three category V agreeing verb forms with an iconically motivated movement.

The forms GO1 (Figure 6.9a) and GO2 (Figure 6.4c) are articulated with the unmarked handshapes and , respectively. The combination of handshape plus movement functions deictically, but the handshape itself does not represent a particular entity like verb forms in the other categories do. LEAVE is articulated with a -handshape and undergoes a hand-internal change such that thumb and index finger make contact at the final place of articulation. While the hand-internal change is not entirely arbitrary – it appears to make reference to an entity becoming optically smaller as it disappears into the distance – the iconic mapping is

more abstract than the sort of handshape mappings described for the other categories. The handshape employed in *HELP1* (Figure 6.9b) also does not appear to be strongly iconically motivated.¹⁹

SMELL1 and *TELL3* (Figure 6.9c), the remaining two forms in category V, are both hybrids. *SMELL1* is additionally a backward verb and thus has a fixed body-anchored final place of articulation. The form is articulated with a -handshape and with wiggling fingers, which may perhaps abstractly represent moving particles. Given the degree of abstraction involved, it seems appropriate enough to classify the form in this category. *TELL3* is articulated in front of the mouth and is combined with a circular movement, which may be reversed for agreement purposes (see Figure 6.9c). As such, the form appears to represent a conduit metaphor, where words, ideas, or other abstract aspects of communication are conceptually treated as objects that can be sent or received (Lakoff & Johnson, 1980/2003; Reddy, 1979). The handshapes used are again quite abstract; note that – unlike with *TELL2* (see Figure 6.4b) – the movement of the hands does not represent signing.

Given that the handshapes of category V forms are not (clearly) iconically motivated, the verbs' movement simply represents a direction, which I have argued is a mapping shared by all agreeing verbs. However, I showed that verbs in the categories I to IV have an enriched mapping for movement and location specifications due to their iconically motivated handshapes. For category V forms, the iconic mapping involved is much less specific; see Table 6.7.²⁰

It should not come as a surprise that three of the forms in this category, namely *GO1*, *GO2*, and *LEAVE*, are typical spatial verbs. The primary semantic characteristic of these verbs is that they indicate a direction, which is precisely the property that is iconically represented in category V forms.

¹⁹ *FOLLOW* has the same handshape specification, and for this verb I have suggested that the hands represent upright animate entities. In the case of *HELP1*, however, it is unclear which entities would be represented.

²⁰ It should be noted that the two hybrid forms *SMELL1* and *TELL3* do have a more specific iconic mapping for one of the locations, since they have a fixed initial or final place of articulation on the body of the signer, mapping onto the body of a referent. This mapping is not represented in Table 6.7.

Table 6.7: Iconic mapping for category V agreeing verb forms.

ARTICULATORS	SOURCE
<i>Handshape:</i> Various	-
<i>Location:</i> initial location	A location
<i>Location:</i> final location	A location
<i>Movement</i>	X goes from the initial location in the direction of the final location

6.2.3 Back to the semantic map

As in Chapters 4.2.3 and 5.2.3, I consider here whether there is a relation between the iconic mapping strategy and the semantics of agreeing verb forms. For this purpose, I reintroduce the semantic map from Chapter 3.5.4 to determine whether verb forms that employ the same mapping strategy also cluster together at particular areas on the map. Figure 6.10 reproduces the map with added color-coding to reflect the different categories discussed in the previous sections.

It can be observed that category I verb forms occur in semantic categories toward the left of the map, in and around the categories ‘Effective Action’, ‘Affected Agent’, ‘Contact’, and ‘Interaction’. This makes sense, because forms of category I involve handling handshapes, and verb classes toward the left side of the map have the most prototypically transitive semantics. A handling handshape makes reference to object manipulation and as such implies the involvement of an agent-like argument as well as a patient-like argument. Verb forms from the other four categories tend to occur more toward the center of the map. The three category II forms, where hands represent moving hands, are interaction verbs. Predictably, the two forms in which the handshape represents eyes (category III) are perception verbs. FOLLOW, the one category IV form with a whole-entity handshape, is situated between the pursuit and interaction classes on the map. The six category V forms with an iconic movement are the least homogeneous in terms of their semantics: they occur in the ‘Motion’, ‘Interaction’, and ‘Perception’ classes. As I discussed in Section 6.2.2.5, it seems appropriate that some of the verbs with the lowest degree of iconicity are verbs of motion (i.e. spatial verbs), as the absence of iconically motivated formal properties referring to event participants makes spatial interpretations more likely.

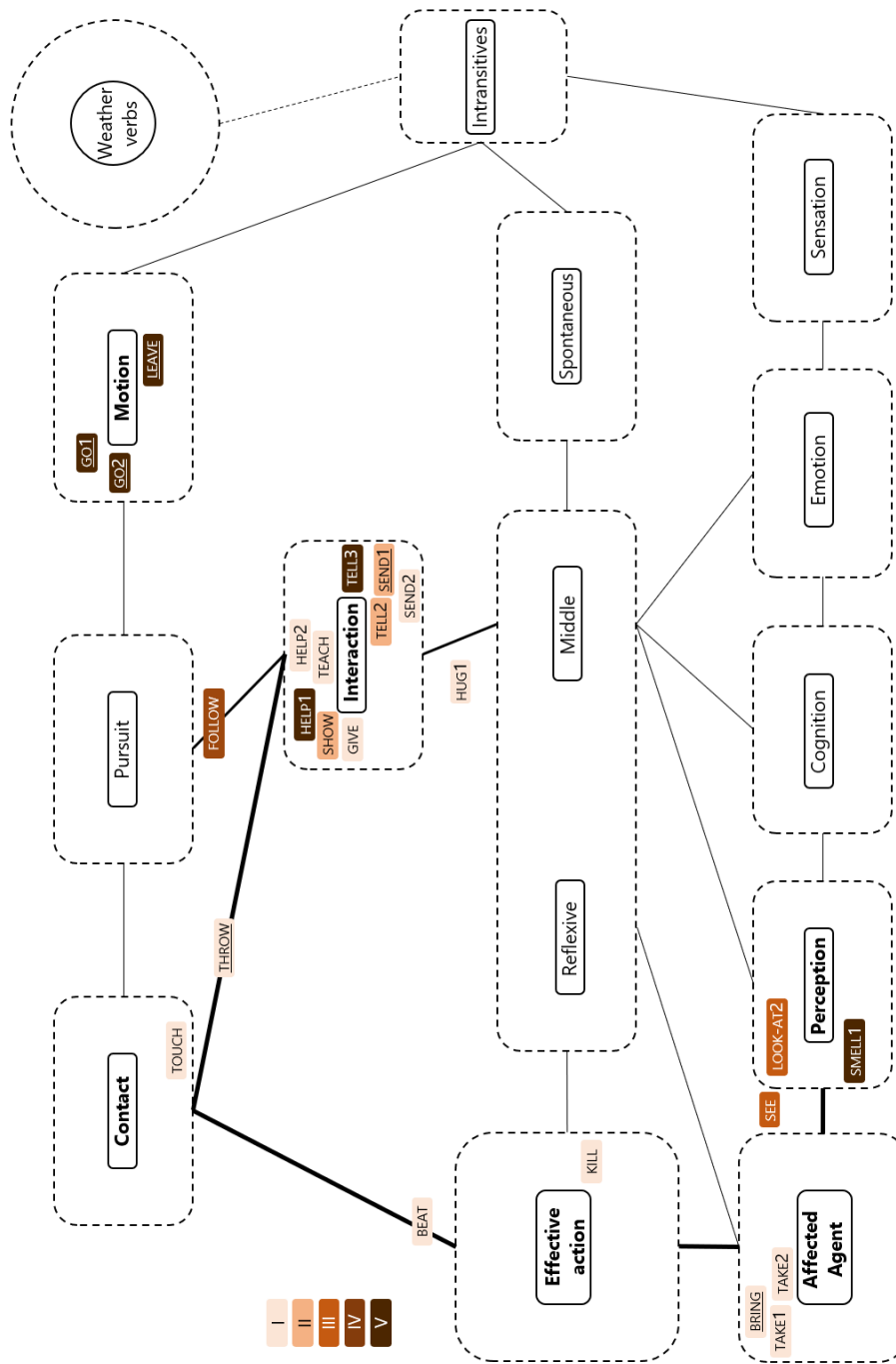


Figure 6.10: The semantic map for agreeing verbs, color-coded to reflect the iconic mapping categories from the classification in Table 6.2. Underscored verb forms are spatial verbs.

6.2.4 Interim summary

In this section, I have shown that agreeing verb forms can be categorized according to recurring iconic form-to-meaning mappings. The verb forms in the DGS data set were distributed across five different categories based on the type of iconic mapping between handshape and event property. The two most common patterns involve the use of handling handshapes and the use of abstract handshapes. The three remaining patterns I identified are hands representing moving hands, hands representing body parts of perception, and hands representing whole entities.

Category I, including agreeing verb forms with handling handshapes, is the most heterogeneous in terms of subtypes of agreeing verbs included: it includes prototypical agreeing verbs, backward verbs, hybrids, and spatial verbs. As discussed in Section 6.2.2.1, a handling handshape triggers a host of different options with regard to how the verb's movement and initial and final places of articulation may be iconically interpreted.

6.3 General sentence structure patterns

Having discussed the formational characteristics of agreeing verb forms, I now turn to a description of their morphosyntactic properties. In Section 6.3.1, I describe the constituent order patterns in clauses with agreeing verb forms in the corpus data. It has been claimed for a variety of sign languages that agreeing verbs favor SOV order (see e.g. Kegl, 2004a, 2004b on ASL; Sze, 2003 on Hong Kong Sign Language; Vermeerbergen et al., 2007 on Flemish Sign Language, as well as Glück and Pfau (1998) on DGS).²¹ Napoli and Sutton-Spence (2014) argue that this cross-linguistically attested pattern is a modality effect which arises because there is a non-arbitrary relation in morphological marking between agreeing verbs and their arguments through spatial indexation, i.e. R-loci. This leads the authors to the generalization that “if an argument affects the phonological shape of the [verb], it precedes [the verb]” (Napoli & Sutton-Spence, 2014, p. 3).²² A quantitative analysis of the corpus data will show how strong the preference for

²¹An exception is Russian Sign Language, for which Kimmelman (2012) reports that clauses with agreeing verbs display SVO order.

²²In a recent paper, Napoli, Sutton-Spence, and de Quadros (2017) further nuance this generalization based on Libras data. The authors claim that SOV order is favored for verbs that denote events which presuppose the existence of an object (e.g. ‘move’), while SVO order enjoys a preference otherwise (as with e.g. the verb ‘want’).

SOV order is in clauses with agreeing verbs in DGS.

Section 6.3.2 focuses on valency patterns, where the obvious expectation is that regular agreeing verbs are transitive or ditransitive. Spatial verbs, on the other hand, are expected to be minimally intransitive, with the possibility of co-occurrence with a locative adjunct.

Section 6.3.3 investigates agreement marking in the DGS data. The primary goal of this section is to assess whether the corpus data provide evidence that such marking is obligatory, and if so, for which arguments. The modification properties of regular agreeing verbs are compared to those of spatial verbs to determine whether there are any qualitative differences that may betray a difference in the underlying grammatical mechanism involved.

Finally, I consider in Section 6.3.4 whether the corpus data provide support for the conclusion by Glück and Pfau (1998) that subject drop in constructions with agreeing verbs in DGS is licensed by agreement marking, following earlier claims made by Lillo-Martin (1986, 1991) for ASL. I also investigate whether the same rule might apply to subject drop in constructions with spatial verbs.

6.3.1 Constituent order patterns

In this section, constituent order patterns in main clauses (Section 6.3.1.1) and dependent clauses (Section 6.3.1.2) are analyzed. Constructions with regular agreeing verbs and spatial verbs are discussed separately. I base my description on surface constituent order, such that it is not possible to make immediate claims about the underlying order of sentences. As such, I might distinguish between orders that are underlyingly identical, or vice versa. Constructions that have the same constituent order but differ with respect to use or scope of role shift markers (indicated by square brackets around the marked constituents) are treated as different orders. This procedure enables an evaluation of the potential effect of role shift on constituent order.

Although a large variety of constituent types were distinguished in the annotations (see Chapter 2.3.2), I only take into account the relative ordering of arguments and predicates in the analysis.

The analysis is based on a total of 335 examples with agreeing verbs. 215 of these constructions include a regular agreeing verb, while 120 examples include a spatial verb. As in previous chapters, impersonal constructions and nominal or adjectival uses of agreeing verb forms are excluded from analysis.

6.3.1.1 Main clauses

6.3.1.1.1 Regular agreeing verbs

Of the 215 examples with a regular agreeing verbs, 187 constitute main clauses. A total of 60 different constituent orders are represented by those examples, of which 18 occur with a frequency of two or more. Those orders are represented in Table 6.8.

Table 6.8: Constituent order in main clauses with regular agreeing verbs (N=187) with a frequency of two or more (N=145). Square brackets indicate boundaries of role shift marking.

Order	#	Order	#	Order	#
[O V]	2	V O	2	[V]	10
S [V O]	2	S [V V']	3	S V CO	10
S O [V]	2	V S	3	O V	11
S V S	2	[S V]	4	S O V	12
S V V' O	2	S V O	7	V	22
S V [CO]	2	S [V]	9	S V	40

As is the case with body-anchored verbs and neutral verbs, the most common orders are S V (N=40; 21.4%) and V (N=22; 11.8%). In addition, 10 examples (5.3%) display [V] order (i.e. with role-shift markers), 9 examples (4.8%) have S [V] order, and an additional 4 examples (2.1%) display [S V] order. If we ignore role-shift markers, then a total of 53 (28.3%) and 32 (17.1%) examples represent S V and V order, respectively. Together, these orders account for close to half of the examples (45.5%).

Examples illustrating S V, V, and [V] order are presented (7).²³ Since agreeing verbs are necessarily (di)transitive, object drop must be involved in each of the clauses in (7); (7b) and (7c) additionally involve subject drop. In all three cases, there is locus alignment between the verb and its arguments.

- (7) a. INDEX_a ONCE-AGAIN_a SEND₂₁ S V
 'He sent me another text.' [lei15-B-00:37.20]
- b. (_a)HELP₁_b+++ V
 '[He] would always help [her]'. [lei04-B-07:16.15]


²³A letter subscript between round brackets, as in (7b) and (7c), means that there is congruence between the locus assigned to a referent and the location marked by the verb form, but that this alignment could also be a phonological coincidence. Section 6.3.3 discusses further details; for a full list of conventions, see Notation conventions.

- c. $\frac{\text{rs}}{a \text{ TAKE1}_{(1)}}$ [V]
 'I] would take [the book].' [mst10-B-06:10.70]

Clauses with agreeing verbs fairly often include a direct object: there are 59 such examples (31.6%) in the 187 main clauses with agreeing verbs. Indeed, S O V and O V are the third and fourth most common constituent orders overall. As with neutral verbs, but in contrast to body-anchored verbs, there is a preference for the object to occur in a preverbal position, with 37 (62.7%) of the examples with an object displaying OV order and 20 (33.9%) showing VO order.²⁴ The remaining two examples involve an object sandwiched in between two instances of the verb. Examples with S O V and O V order are illustrated in (8a) and (8b), respectively. S [V O] order is displayed in (8c), which includes the hybrid verb SEE. Since SEE has an obligatory initial body-anchored place of articulation, the alignment with the locus of first-person subject is not so much a demonstration of explicit agreement but rather an accidental correspondence.

- (8) a. INDEX_a VERY MANY _a **HELP1**_{pl} S O V
 'She helped a lot of people.' [sh07-B-03:32.30]
- b. MANY TRY (_a) **SHOW** O V
 '[He] showed a lot of experiments.' [stu13-A-09:38.95]
- c. INDEX₁ $\frac{\text{rs}}{(1) \text{ SEE}_a \text{ INDEX}_a}$ S [V O]
 'I saw it.' [lei13-A-05:51.80]

The agreeing verbs LOOK-AT2, HELP1, SEE, SHOW, TELL2, and TELL3 may co-occur with a complement clause, which generally follows the matrix verb. Two examples are presented in (9).

- (9) a. DEVELOP \ SCHOOL INDEX₁ ₁ **SEE**_{a++} \ INDEX_a SEVERAL ABROAD
 COME+++ OUTSIDE CL(

²⁴In one of the examples with OV order, there is a clear prosodic boundary separating the object from the rest of the clause, thus suggesting that the object has been topicalized. No such prosodic boundaries were attested in the other examples.

Use of role shift does not appear to affect constituent order: the order ratios among clauses with role shift are comparable to those among clauses without role shift. One potential observation of note is that three examples include both role-shift markers and two synonymous verbs (the second of which is labeled *V'* in the annotations). One of these examples is presented in (10). The sentence includes a classifier predicate referencing the tool used in the beating denoted by the lexical verb *BEAT*. It might be the case that role-shift environments are conducive toward synonymous verb constructions, although this potential effect should not be overstated: there are also five examples without role shift in the corpus data that include two synonymous verbs.²⁵

(10) TEACHER $\overbrace{1\text{CL}(\text{手}):BEAT-WITH-STICK}_{\text{RS}}}_{\alpha} 1\text{BEAT}_{\alpha}$ S [V V']
 'The teacher beat us with a stick.' [koe17a-B-04:40.50]

To sum up, the most common orders in clauses with regular agreeing verbs are S V and V, the canonical position of the direct object is preverbal but there are also a fair number of postverbal objects, complement clauses follow matrix clauses, and the presence of role shift does not appear to strongly affect constituent order.

6.3.1.1.2 Spatial verbs

In the 98 main clauses in the data that contain a spatial verb, a total of 33 different constituent orders are attested; of those, 23 orders occur just once. Table 6.9 tabulates the frequencies of constituent orders that occur at least twice in the data.

Table 6.9: Constituent order in main clauses with spatial verbs (N=98 in total) with a frequency of two or more (N=75). Square brackets indicate boundaries of role shift marking.

Order	#	Order	#	Order	#
O/Loc V	3	S V O/Loc	4	O V	12
[S V]	4	S O/Loc V	5	V	12
[V]	4	V O/Loc	5	S V	22
S V O/Loc V	4				

Again, the most commonly attested constituent orders are S V (N=22; 22.4%)

²⁵Overall, there are far fewer examples with than without role-shift markers, such that the percentage of synonymous verb constructions among clauses with role shift is higher than that in clauses without role shift.

and V (N=12; 12.2%), with O V order also occurring 12 times (12.2%). Examples illustrating each of these orders are shown in (11).²⁶ Of the 17 spatial verb constructions that contain a direct object, 16 involve a preverbal object, with just one example displaying a postverbal object.

- | | | |
|------|---|---------------------|
| (11) | a. INDEX _a LEAVE _{b*} | S V |
| | ‘They left.’ | [hb06a-B-02:08.95] |
| | b. LATER ₍₁₎ GO ₁ _{a*} | V |
| | ‘[We] left later.’ | [koe20-A-01:36.80] |
| | c. YOUNG SON _{a*} BRING ₍₁₎ | O V |
| | ‘[I] will bring my youngest son.’ | [ber12b-A-12:43.95] |

Of course, spatial verbs may also co-occur with locative constituents. Of the 98 main clauses with spatial verbs, 30 constructions (30.6%) include such a constituent. In 13 of these 30 cases (43.3%), the locative constituent occurs in preverbal position; an example is given in (12a). In this example, the final place of articulation of the verb aligns with the pointing sign at the beginning of the sentence. This indexical refers to Japan, which had been localized earlier in the discourse.²⁷ 12 examples (40.0%) display V O/Loc order (12b). In (12b), the endpoint of the verb corresponds to the locus of the postverbal constituent LAKE, which is articulated slightly toward the signer’s left. Finally, one example with a locative constituent involves clear topicalization of that constituent, while the remaining five examples involve either a locative constituent sandwiched in between two verb copies (12c) or two locative constituents sandwiching a verb.

- | | | |
|------|---|---------------------|
| (12) | a. INDEX _a ^{re} WORLD CONGRESS GO ₁ _a | O/Loc V |
| | ‘We went to the World Congress there.’ | [mst01-A-00:23.80] |
| | b. INDEX ₁ ALWAYS TOGETHER ₍₁₎ LEAVE _a LAKE _a | S V O/Loc |
| | ‘We often left for the sea together.’ | [ber12b-B-01:32.30] |

²⁶An asterisk following a subscript, as in each of the examples in (11), indicates that the verb appears to mark a locus but this locus has not previously been introduced. See the Notation conventions or Section 6.3.3 for further details.

²⁷Note that INDEX_a and the following sign are marked by raised eyebrows. As such, the part preceding the verb may be topicalized, such that there may have been movement from postverbal position for this purpose.

- c. THEN 4-WEEK 5-WEEK LATER $\overline{\text{bl}}$ INDEX₁ (1) GO1_{a*} DRESDEN (1) GO1_{a*}
 S V O/Loc V
 ‘Then, four or five weeks later, I visited Dresden.’ [koe22-A-05:12.25]

Thus, the corpus data with spatial verbs reveal a qualitative difference between direct objects and locative constituents: the latter occur pre- and postverbally in approximately equal measure, while direct objects clearly favor a preverbal position. These results present an argument against the position that locative constituents behave like direct objects (cf. Kimmelman, 2018a).²⁸

6.3.1.2 Dependent clauses

There are 28 dependent clauses with agreeing verbs and 22 dependent clauses with spatial verbs. Given that these numbers are rather low, I do not present a table with the most frequent constituent orders. Indeed, the results do not yield any big surprises. Constructions with S V or V orders are once again frequently attested, accounting for 13 of the examples with regular agreeing verbs and nine of the examples with spatial verbs. (13a) displays an example with an agreeing verb and S V order. The second-most common order in constructions with spatial verbs is S O/Loc V (N=4); an example is presented in (13b). Still, as in main clauses, it is not the case that preverbal position of a locative constituent is favored over postverbal position: there are five examples in which the locative constituent follows the verb. Finally, only a handful of dependent clauses – seven with a regular agreeing verb and four with a spatial verb – include a direct object, thus making it impossible to draw any conclusions about this argument’s preferred position in dependent clauses.

- (13) a. INDEX₁ THINK \ FATHER_{a*} TELL₂₁ # S V
 ‘I think my father told me about it.’ [mvp07-B-07:18.60]
- b. $\overline{\text{re}}$
 INDEX₁ FOOTBALL TRAINING (1) GO1_a \ SUBJECT++ PU # S O/Loc V
 ‘When I went to football training, it was the topic [of conversation].’
 [hh03b-A-04:59.15]

²⁸Also see Chapter 5.3.2.

6.3.2 Valency patterns

In this section, I discuss valency patterns in constructions with regular agreeing verbs (Section 6.3.2.1) and spatial verbs (Section 6.3.2.2). In anticipation of the discussion on agreement marking by agreeing and spatial verbs in Section 6.3.3, I also habitually comment on the localization properties of the verb tokens in the examples presented in this section.

6.3.2.1 Regular agreeing verbs

All regular agreeing verbs can be used at least transitively. Transitive verbs include BEAT, FOLLOW, HELP2, and TAKE1 as well as HUG1, KILL, SMELL1, TAKE2, and TOUCH, although for the latter verbs holds that only three or fewer tokens are attested in the corpus data. (14) presents three transitive constructions. In (14a), which involves quotative role shift, the verb BEAT occurs with a subject (repeated once) and an object, as well as a constituent indicating the instrument used in the beating (STICK). The verb moves from the signer to a neutral locus – the center of the signing space – corresponding with the place of articulation of the object ALL. In example (14b), the verb FOLLOW occurs with an overt object and a null subject. The path movement of the verb goes from subject to object. Examples with null objects are also attested, such as (14c) with the backward verb TAKE1. The loci that are used as beginning and end points of the verb's path movement correspond to those assigned to the relevant referents earlier in the discourse.²⁹

- (14) a. $\frac{\text{INDEX}_1 \text{ ALL } \text{INDEX}_1 \text{ STICK}_1 \text{ BEAT}_{(a)}}{\text{rs}}$ [S O S O/Instr V]
 "I'm going to hit you all with a stick." [koe17a-B-06:00.10]
- b. $\frac{\text{INDEX}_1 \text{ RIGHT FEEL-GOOD} \setminus \text{INDEX}_{a 1} \text{ FOLLOW}_a}{\text{re}}$ O V
 'When I feel comfortable, [I] would follow him.' [mst10-B-10:57.65]
- c. $\frac{\text{MOTHER}_a \text{ TAKE1}_b}{\text{hs}}$ S V
 'The mother couldn't even keep [the children].' [sh07-A-04:43.70]

The verbs SEE and LOOK-AT2 are transitive and optionally allow a clausal object. In example (15), for instance, the hybrid verb SEE is followed by a complement clause. In such examples, the final place of articulation of the verb is at the center of the signing space.

²⁹Note that, since TAKE1 is a backward verb, the subscript *a* corresponds to the locus of the object and the subscript *b* to the locus of the subject.

- (15) NOW POSS₁ MAN₍₁₎ **SEE** \ CLASS MUCH ALL WRITE MISTAKE S V \ CO
 'My husband noticed many five graders make strikingly more mistakes than
 before.' [stu13-B-03:57.20]

The verbs GIVE, SEND2, and TEACH, as well as SHOW, TELL2 and TELL3 may be used ditransitively, with the latter three also allowing clausal complements. When these verbs express agreement, the path movement goes from subject to indirect object (the recipient/goal argument). (16) presents several examples. All three arguments are overt in (16a). The verb TEACH agrees with both the subject and the indirect object. Example (16b) with the verb GIVE has two null objects and an overt subject. The verb moves from a locus that might be associated with the subject UNCLE, except that this subject has not previously been localized. As such, the verb appears to localize this referent on the spot. This is indicated by the asterisk following the subscript *a*. (16c) displays an example with the verb SHOW and a clausal complement under the scope of role shift. Finally, HELP1 in example (16d) also takes a clausal complement. The verb agrees with the the locus associated with the (null) subject and the locus associated with the indirect object.

- (16) a. LIFE-PARTNER INDEX₁ INDEX_a **TEACH**₁ MANUAL-ALPHABET S O2 S V O
 'My partner taught me the manual alphabet.' [koe13-A-05:57.10]
- b. DDR TIME UNCLE_{a*} **GIVE**₁ S V
 'My uncle had given [a Mark] to me from the DDR era.'
 [lei13-A-09:20.90]
- c. dh: INDEX_a **SHOW**_b \ ^{RS}RUSSIA GOT-YOU
 ndh: INDEX_b S V O2 [CO]
 'They (the Americans) showed the Russians that they fell for the trick.'
 [koe05-A-04:25.25]
- d. INDEX₁ **HELP**₁ CUCUMBER CHOP O2 V CO
 '[He] helped me chop the cucumber.' [hh01-A-03:59.45]

All the verbs listed in the previous paragraph may also be used (mono-)transitively; two examples are displayed in (17). Both examples do not include an indirect object (i.e. a recipient); in fact, it does not appear to be part of the argument structure.³⁰ Now, agreeing verbs would generally be expected to align with the locus of the recipient argument at the end of their trajectory. However, this is not

³⁰Note that in (17a), the direct object ('hearing aids') is non-overt.

possible for the examples in (17), since there is no argument to agree with. Interestingly, such examples consistently show the final place of articulation of the agreeing verb to be the center of the signing space (also see Section 6.3.3).

- (17) a. $\text{INDEX}_a \frac{\text{RS}}{1} \text{TELL3}$ S [V]
 'He talked [about hearing aids].' [stu13-B-11:34.40]
- b. $\text{INDEX}_1 (a) \text{SHOW} \setminus \text{UNTIL GET-OUT}$ S V CO
 'They would show the exit [from the lunar module].'
 [mst13-A-01:36.30]

6.3.2.2 Spatial verbs

The verbs GO1, GO2, and LEAVE may occur with a subject and an optional locative constituent; three examples are presented in (18). In (18a), GO1 has a path movement which goes from the signer to a locus that has not previously been introduced, but which could refer to the geographical location of AUSTRIA. Indeed, BACK-AND-FORTH references the same locus. In (18b), which does not include any overt arguments, the trajectory of the verb GO2 aligns with the first-person subject (i.e. the signer) and a previously established locus associated with the city of Taipei. Finally, (18c) includes the verb LEAVE and a subject. The path movement of the verb goes from the signer to some locus in the signing space which is not associated with any particular location.

- (18) a. $\text{INDEX}_1 \text{REGULAR} (1) \text{GO1}_{a*} \text{AUSTRIA } 1 \text{BACK-AND-FORTH}_{a++}$ S V O/Loc
 'We went to Austria over and over again.' [hb06a-B-00:08.95]
- b. $\text{RATHER INVOLVED} (1) \text{GO2}_a$ V
 'I wish I had been there.' [koe19b-A-08:15.45]
- c. $\text{INDEX}_1 (1) \text{LEAVE}_{a*}$ S V
 'I left.' [lei13-A-04:38.30]

Finally, the verbs BRING, SEND1, and THROW occur in transitive constructions with a subject and an object and may additionally allow a locative constituent. (19) presents two examples. In (19a), the trajectory of the verb BRING goes from a locus on the signer's right to a locus on the signer's left. The initial place of articulation appears to correspond to the subject locus, which is a first-person plural

pronoun articulated in the preceding clause.³¹ However, in other examples, such as (19b), the verb appears to show object agreement at the start of its trajectory (see Section 6.3.3.2 for discussion). The final location is congruent with the place of articulation of the signs HIGH SCHOOL, which are articulated immediately following the verb.

- (19) a. NONE MEDAL_a **BRING**_{b*} O V
 '[We] didn't bring any medals home.' [ber04-B-02:39.55]
- b. POSS₁ FATHER WANT \ INDEX₁ (1) **SEND**_{1(a)} HIGH_a SCHOOL_a # O V O/Loc
 'My father wanted to send me to college.' [mst16-B-01:41.85]

The next section further scrutinizes the agreement properties of agreeing verb forms.

6.3.3 Agreement properties

The agreement properties of regular agreeing verbs (including backward verbs) and spatial verbs are discussed in Section 6.3.3.1 and 6.3.3.2, respectively. With regard to the former, I pay special attention to the degree of optionality of agreement marking. With regard to the latter, much of the discussion focuses on the type of constituents verbs with a spatial semantics tend to align with.

First, let me recapitulate from Chapter 2.3.4 how agreement properties are annotated in the DGS corpus data. Remember that agreeing verbs and spatial verbs are distinguished from each other on the AS-type tier with the labels 'agreeing' and 'agreeing-sp', respectively. Agreement properties are then indicated for both verb types on the AS-1-agreement and AS-2-agreement tiers. The numbers in the tier names refer to the first and second agreement slots, i.e. the initial and final places of articulation of the agreeing verb. A variety of annotation values are possible.

Firstly, when a verb expresses unambiguous agreement with a referent or location by means of alignment of its place of articulation with a locus associated with that referent or location, it receives the annotation value 'agreeing'. Example (20), for instance, displays double agreement marking and is thus annotated as

³¹The object NONE MEDAL is not localized as NONE is articulated directly in front of the signer and MEDAL is body-anchored.

‘agreeing’ on both the AS-1-agreement and AS-2-agreement tiers.³²

- (20) ${}_a\text{BEAT}_1$ V
 ‘[The Hungarians] beat [us].’ [ber04-B-05:48.50]

Sometimes a verb aligns with a distinct locus that has not been associated with a referent in the discourse yet, such that the verb appears to simultaneously localize a referent or location as well as mark agreement with it.³³ An example illustrating this pattern is shown in (21), with Figure 6.11 illustrating that the verb *SHOW* is clearly modified. Another example was previously displayed in (16b). In these examples, an asterisk following the locus subscript indicates that the locus the verb aligns with is newly introduced into the discourse. On the annotation tiers, the label ‘agreeing-new’ is used to signal such cases.

- (21) $\text{RIGHT } {}_1\text{SHOW}_{a*}$ V
 ‘[I] always show [them] [the two deaf clubs].’ [ber12b-B-05:43.45]



Figure 6.11: An instance of the verb *SHOW* displaying clear modification of its final place of articulation, despite the object of the verb not having been assigned a locus.

In other examples, the verb apparently aligns with an argument, but this might also have been a phonological consequence of articulating the verb directly after the argument or another sign articulated at the same location. That is, the verb’s place of articulation could have been influenced by the preceding sign. Such instances are labeled ‘congruent-a’. An example is presented in (22); the screen-

³²In (20), both arguments are null but the subject referent had been assigned a locus earlier in the discourse, while the signer represents the object.

³³Spatial verbs frequently mark loci that have not previously been introduced in the discourse. Section 6.3.3.2 addresses this observation in more detail.

shots in Figure 6.12 illustrate the articulation of the subject and the verb directly succeeding it. As can be observed, TELL3 is articulated slightly toward the signer's left, which is in accordance with the locus of the subject. Congruence is indicated in glossed examples by means of round brackets around the locus subscript ('(a)').

- (22) INDEX_a (a) TELL3₁ FROM CREATION PU S V O
 'He also talked to me about the Creation.' [mst10-B-03:37.25]



Figure 6.12: The signs INDEX_a (left) and TELL3 (right) from example (22), where the initial place of articulation of the verb might have been phonologically influenced by that of the subject.

Other congruent but ambiguous cases involve an argument being localized at or close to the center of the signing space. When a verb begins or ends its path movement at that same location, it is difficult to establish whether it expresses agreement or simply occurs in unmodified form. Such examples are labeled 'congruent-b'. This category corresponds to the category Fenlon et al. (2018) call 'congruent' in their study on agreement marking in BSL. (23) presents an example of a verb with a final place of articulation annotated as 'congruent-b'. In the example, FAMILY is assigned a locus by the locative predicate PRESENT, which is articulated only slightly toward the signer's left (see Figure 6.13a). The verb FOLLOW, subsequently, has a path movement which also ends at this location in the signing space.

- (23) INDEX₁ FAMILY PRESENT_(a) [...] INDEX₁ 1 FOLLOW_(a) S V
 'I had some family members there. [...] I followed their lead.'
 [goe03-A-03:54.20]

There are also several annotation options possible for verb tokens which do



Figure 6.13: (a) FAMILY becomes associated with a locus slightly left of the center of the signing space through localization of the locative predicate PRESENT. (b) The final place of articulation of the verb FOLLOW is congruent with the locus of FAMILY.

not appear to show agreement. The label ‘unclear’ is used when (i) the argument the verb is expected to agree with has not been localized, and (ii) the verb’s place of articulation is at or close to the center of the signing space. Clear incongruence between the place of articulation of the verb and the argument locus it is expected to agree with is annotated as ‘incongruent’. This also includes examples where the verb, but not the argument it should agree with, is articulated at the center of the signing space. Finally, several agreeing verbs are hybrids and have a fixed initial (SEE) or final (HUG1, SMELL1) place of articulation on the body, such that no alignment between the verb and its subject can be expected to occur. This is indicated with the label ‘body’ on the relevant tier.

The annotation ‘default’ signals that there is no (indirect) object for a verb to agree with. As I discussed in Section 6.3.2.1, some verbs may be used both transitively as well as ditransitively. In the former case, it is the recipient argument which does not occur in the verb’s argument structure; coincidentally, this is also the argument that the verb would otherwise express agreement with. The corpus data show that such transitively used agreeing verbs consistently end their trajectory at the center of the signing space by way of default.

The label ‘default’ is also used for some examples involving SEE and LOOK-AT2 taking an object which indicates a certain scenario witnessed by the subject rather than a concrete entity. In those cases, the final place of articulation, at the center of the signing space, may also be considered a default.

The seven basic labels described above may be followed by additional speci-

fications in case a verb is not a prototypical agreeing verb, that is, when it is characterized by something else than a path movement from subject to direct object. Firstly, ditransitive verbs (GIVE, SEND2, TEACH, SHOW, TELL2, TELL3) which align with their goal or recipient argument, analyzed in this dissertation as indirect objects, receive the additional specification ‘-o2’. For backward verbs, ‘-o’ and ‘-s’ indicate that the verb agrees with the object at its initial place of articulation and with the subject at its final place of articulation. For verbs with a spatial semantics, the type of constituent a token appears to align with is always explicitly specified. Alignment with a locus which may be associated with an argument is signaled with the suffix ‘-s’, ‘-o’ or ‘-o2’, depending on the argument. When the verb’s initial or final place of articulation aligns with a location, the suffix ‘-loc’ is used. Labels may be combined (e.g. ‘-s/loc’) in case of ambiguity. Finally, when plurality is marked in a verb form by means of iterations of the sign at incrementally shifting beginning or end points, the label ‘-pl’ is added to the basic annotation.

6.3.3.1 Regular agreeing verbs

Table 6.10 tabulates the frequencies and proportions of the different agreement patterns with regular agreeing verbs at the initial place of articulation.

Table 6.10: Agreement patterns with regular agreeing verbs (N=215) at the first agreement slot.

Agreement pattern	Spec.	#	%
agreeing		100	46.5
	-pl	2	0.9
	-o	12	5.6
agreeing-new		8	3.7
	-o	3	1.4
congruent-a		5	2.3
	-pl	1	0.5
congruent-b		31	14.4
	-o	1	0.5
	-pl	1	0.5
body		38	17.7
unclear		4	1.9
	-o	1	0.5
incongruent		7	3.3
	-o	1	0.5

Of the 215 examples with regular agreeing verbs, 102 examples (47.4%; including two forms with plural marking) display unambiguous agreement with their subject. Twelve examples (5.6%) involve a backward verb and thus agree with the object rather than the subject. An additional eleven examples – eight (3.7%) with regular and three (1.4%) with backward verbs – involve the verb starting at a locus which is clearly off-center but which does not appear to have been associated with a referent yet. These examples suggest that localization has occurred on the fly. Six examples (2.8%; including one plural) seemingly express agreement, although the verb's place of articulation may have been influenced by the place of articulation of the preceding sign, while 31 tokens (14.4%; one plural form and one backward verb included) are articulated at or close to the center of the signing space, just like the referent they are expected to agree with.

In 38 cases (17.7%) – all instances of the verb form *SEE* – agreement marking cannot occur because the verb has a fixed initial body-anchored place of articulation. Five examples (2.3%; including one backward verb) are labeled 'unclear': they have a central place of articulation, and the argument they are expected to agree with has not been localized earlier in the discourse. Finally, there are eight examples (3.7%) of clear incongruence between the locus of the referent and the starting locus of the verb.

The findings above contrast with those reported by Fenlon et al. (2018) for BSL. They claim that 31% of the agreeing verb tokens in their data set are articulated at a location which is incongruent with the agent locus. If the DGS verbs labeled 'unclear' and 'incongruent' – which are likely collapsed into the same category 'incongruent' in Fenlon et al. (2018) – are added up, and the examples in Table 6.10 involving object agreement or a fixed body-anchored initial place of articulation are excluded, then only 7.3% of regular agreeing verb tokens in the corpus DGS data are incongruent with their subject locus.³⁴ Conversely, 92.7% of tokens express what Fenlon et al. (2018) would categorize as agreement.³⁵ A more detailed comparison between DGS and BSL is presented in Chapter 7.5.

³⁴This number changes slightly if backward verbs are also taken into account. Table 6.11 indicates that ten backward verbs agree or are congruent with their subject, while two examples are incongruent. An additional six examples include the hybrid verbs *HUG1* or *SMELL1*, which have a body-anchored place of articulation ('body'), but these are excluded from the calculations as they are constrained from being modified. Of the 171 examples with regular or backward agreeing verbs, then, 13 (7.6%) would be analyzed as being incongruent with the subject locus.

³⁵To be more exact, Fenlon et al. (2018) present two analyses; one in which they group agreeing and congruent examples together, and one in which they treat them separately.

The results with respect to agreement marking at the final place of articulation of agreeing verbs, which usually corresponds with object marking, are presented in Table 6.11.

Table 6.11: Agreement patterns with regular agreeing verbs (N=215) at the second agreement slot.

Agreement pattern	Spec.	#	%
agreeing	-o2	59	27.4
	-s	58	27.0
	-s	7	3.3
	-pl	2	0.9
agreeing-new	-o2	6	2.8
	-s	5	2.3
	-s	1	0.5
	-pl	2	0.9
congruent-a		1	0.5
congruent-b		18	7.3
	-o2	2	0.5
	-s	2	0.9
body	-s	6	2.8
default		35	16.3
unclear		1	0.5
	-o2	1	0.5
incongruent		3	1.4
	-o2	4	1.9
	-s	2	0.9

A total of 119 (55.3%) examples unambiguously agree with a singular or plural direct or indirect object. An additional 13 (6.0%) examples appear to localize an object on the spot ('agreeing-new'). 21 (9.8%) examples display congruence between the place of articulation of the verb and the object locus. Just two (0.9%) examples are annotated as 'unclear', while seven (3.3%) examples with regular agreeing verbs are incongruent. Six examples involve backward verbs with a fixed final place of articulation, while 35 examples involve constructions either without an indirect object or with a complement clause as an indirect object, such that the verb has a default place of articulation at the center of the signing space.

To again make a binary distinction between agreeing vs. incongruent examples, we group together all examples labeled 'agreeing', 'agreeing-new', 'congruent-a', and 'congruent-b' vs. all tokens which are annotated as 'unclear' and 'incongruent', excluding the examples with backward verbs. Examples with the annotations

'body' or 'default' are excluded from the count. This yields a total of 153 (94.4%) out of 162 agreeing verb tokens expressing object agreement, as opposed to just nine (5.6%) examples lacking agreement marking.³⁶ Again, these proportions differ from those reported for BSL in Fenlon et al. (2018). In their study, 26% of verb tokens are incongruent with the location of the patient argument.

Based on the findings reported in this section, it can be concluded that (a) subject and object marking are almost equally frequently attested in DGS, and (b) agreement marking occurs in a large majority of cases in the data, casting doubt over the conjecture that agreement marking in DGS is optional. These findings contrast with those reported by Fenlon et al. (2018) for BSL. For further discussion, see Chapter 7.5.

6.3.3.2 Spatial verbs

In terms of agreement properties, spatial verbs were rather more challenging to analyze than regular agreeing verbs. In part, this is due to the frequently occurring ambiguity with respect to whether a locus marked by the verb refers to a location or (additionally) a referent. In addition, it turned out that spatial verbs often mark loci that are not (yet) associated with anything previously localized in the discourse – be that a location or referent. Regardless, I believe these observations are quite revealing about the nature of spatial verbs.

The six spatial verb forms in the corpus data can be divided into two subcategories on the basis of their agreement patterns.³⁷ The division corresponds to the division I made based on the valency patterns of these verbs (Section 6.3.2.2).

Firstly, GO1, GO2, and LEAVE (N=87) – all verbs that do not take a regular direct

³⁶When the annotation values at the initial place of articulation of backward verbs (see Table 6.10) are included, the percentage of agreeing tokens becomes 93.9%, as opposed to 6.1% of incongruent examples.

³⁷Doing so makes presenting tables, as I have done in the previous section for regular agreeing verbs, rather uninformative, as it means that each subcategory includes only a few verb forms. Another reason for refraining from presenting tables is that, due to the nature of the annotation system, the attested patterns are not always reflected well by the annotations. For instance, a verb such as GO1 consistently starts its trajectory from a locus close to the signer. Such a form would be analyzed as being 'congruent-b' with a first-person subject referent but 'incongruent' with a non-first person subject – although in the latter case it might still be the case that the verb expresses agreement or congruence with a *location*. It turned out that these complexities are difficult to capture with the annotation values that were used. For these reasons, I present the patterns found in the data in a more descriptive manner.

or indirect object – tend to start from a locus close to the signer and end at a locus further away from the signer, which may be in any possible direction. Indeed, this pattern can be observed even when the subject is not the signer, as in (24). Figure 6.14 illustrates the articulation of the subject and the verb in this clause.

(24) INDEX_a 1 LEAVE_{b*} S V
 'He left.' [hb06a-A-07:28.00]



Figure 6.14: A third-person pronoun followed by the verb LEAVE, which starts from a location near the signer’s body and ends at a location on the edge of the signing space. The non-dominant hand holds the third-person pronoun referring to the subject throughout the articulation of the verb.

In fact, there are no tokens of GO1, GO2, or LEAVE in the data which show unambiguous agreement with a non-first person subject referent. While there are some congruent examples, these all involve cases in which the subject referent is associated with a locus close to the signer. This is not to say that it is impossible for these verbs to express subject agreement – in fact, the two DGS informants both claim that this is possible – but it is evident that subject marking is certainly not the default.

Furthermore, analysis of the data casts doubt on another claim that often seems to be made (or implied) with regard to spatial verbs, namely that both their initial and final slots are aligned with semantically meaningful locations. It has been argued by many, for instance, that spatial verbs express agreement with locations that correspond to the source and goal of motion (Fischer & Gough, 1978; Meir, 1998, 2002). But if that were to be the case, then one would expect more variation with respect to where a spatial verb starts out in the signing space. Instead, each of the three verbs discussed here almost always start from the same

place of articulation, thus making it implausible that this location is necessarily semantically meaningful. I should note that there are two clear examples in the corpus data including a spatial verb that does have a modified initial place of articulation aligning with a location; one of these examples is illustrated in (25). The second instance of GO1 in (25) marks the location introduced on the fly by the final place of articulation of the first instance of the verb. The location which is referred to is 'Africa'.

- (25) INDEX₁ AFRICA (1) **GO1**_{a*} \ TELL1 \ _a**GO1**_{b*} \ INDEX₁ DIA EXPERIENCE
 'If I were to go to Africa, then, when I'd come back, I could talk about my experiences.'
 [koe19a-A-06:12.60]

As for the final place of articulation, there is more variation, with signers using so many different locations that – when put together – these locations more or less form an arc in the signing space. Strikingly, in 66 out of 87 examples (75.9%), the signer references a location in space which has not previously been introduced in the discourse (annotated as 'agreeing-new-loc'). It is furthermore notable that the final place of articulation often occurs toward the far edge of the signing space, as with LEAVE in (24) (see Figure 6.14). In just 16 examples (18.4%), the signer clearly marks a location introduced earlier in the discourse. The remaining five examples are annotated as congruent or unclear.

From these numbers, we can conclude that spatial verbs generally end their trajectory at a non-neutral yet un-introduced location, even when it is unclear from the context what location the final place of articulation would semantically correspond to. (24) is a clear example of this. It is possible that signers use geographical knowledge about locations to determine the end locus of a spatial verb, although this does not seem to be a necessity. Again, it can be concluded that the behavior of these verbs clearly differs from that of regular agreeing verbs.

The verb forms BRING, SEND1, and THROW (N=33) generally start their trajectory at a locus which can be associated with a patientive argument, which I analyze as a direct object. An example is shown in (26), illustrated with video stills in Figure 6.15. As such, these spatial verbs are unlike regular agreeing verbs, which start their trajectory from the subject locus. They also do not behave like backward verbs, as the final place of articulation of these spatial verbs generally does not correspond to that of the subject (see below).

- (26) WITH POSS₁ CHILD++_a CLEAR POSS₁ _a**BRING**_{b*} O V
 '[I] would take my children with me.' [koe20-A-04:35.60]

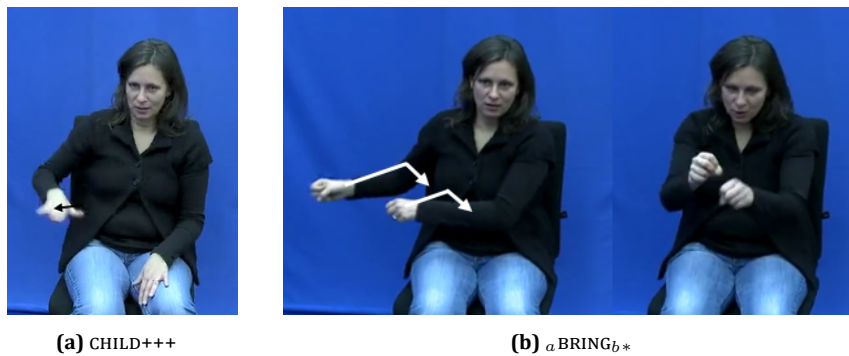


Figure 6.15: (a) The localization of the object CHILD++ from example (26). (b) The articulation of the verb BRING, which starts at the object locus and ends at some previously unintroduced location.

Interestingly, there are several examples in which the spatial verb appears to start out from the subject locus. One of these examples was previously displayed in (19a); it is repeated below as (27) and illustrated with the video stills in Figure 6.16. The subject pronoun INDEX_{1pl} was signed a couple of clauses preceding (27). It is articulated with an arc movement resulting in contact with the signer’s chest (see Figure 6.16a).

(27) NONE MEDAL α BRING β^* O V
 ‘[We] didn’t bring any medals home.’ [ber04-B-02:39.55]

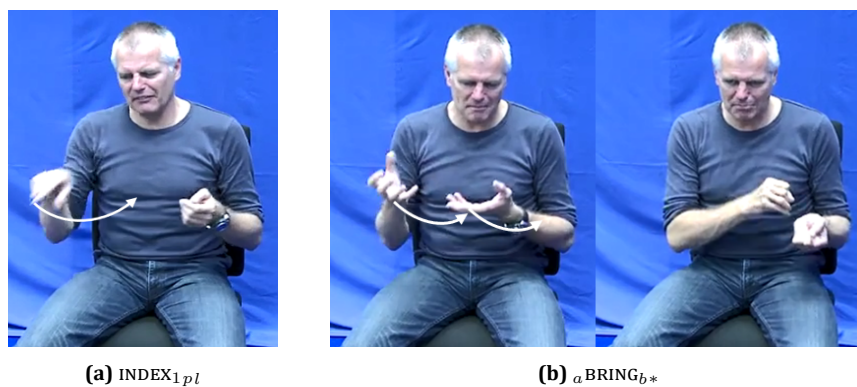


Figure 6.16: A first-person plural pronoun, articulated in the clause preceding the construction in (27), and the articulation of the verb BRING in (27).

The final place of articulation of the verbs BRING, THROW, and SEND1 frequently

marks out a previously unintroduced location in the signing space (19 out of 33 (57.6%) examples are labeled ‘agreeing-new-loc’). Still, there are also examples that align with a previously established locus referring to either a location or a referent: a handful of instances of BRING appear to end their trajectory at the subject locus, while the verbs THROW and SEND1 show some potential for alignment with the indirect object locus at the end of their trajectory (28) (see Chapter 8.1.1 for further discussion).³⁸

(28) INDEX_a WITH _aSEND1_b S V
 ‘They have to send [it] back [to China / the Chinese].’ [goe05-A-12:48.75]

To conclude, the discussion of the corpus data above shows that spatial verbs display clearly different behavior from agreeing verbs with regard to their alignment properties, suggesting that they should also be analyzed differently in formal terms. In Chapter 8.1, I propose a theoretical analysis of spatial verbs to account for the patterns described above.

6.3.4 Subject-drop patterns

In this section, I investigate subject-drop patterns, paying particular attention to the interaction between agreement marking and subject drop: if agreeing verbs license subject drop through agreement marking (as proposed by Lillo-Martin, 1986, 1991), then we should find no examples with both null subjects and lack of agreement marking.³⁹ Subject-drop patterns with regular agreeing verbs, including backward verbs, are discussed in Section 6.3.4.1, followed by a discussion of subject drop in constructions with spatial verbs in Section 6.3.4.2.

6.3.4.1 Regular agreeing verbs

To start off, there are three verbs (SEE, HUG1, SMELL1) with a fixed body-anchored place of articulation where subject marking would otherwise be expected. Under the hypothesis, proposed in Chapter 4.3.3, that body-anchoring leads to a default first-person interpretation of the subject in the absence of an overt argument,

³⁸The remaining examples are congruent or unclear.

³⁹Object-drop patterns are not systematically analyzed in this dissertation, and are left to future research. However, as illustrated by the constituent order patterns in Section 6.3.1, it is clear that it occurs – and with a higher rate than subject drop – both with agreeing verbs as well as the three spatial verbs BRING, LEAVE, and SEND1.

the prediction for these verbs is that they do not occur with null non-first person subjects. And indeed, no such examples are attested. Of the 44 examples including either of these three verb forms, 14 include an overt non-first person subject (N=11) or a null non-first person subject but in combination with role shift (N=3). The remaining 30 examples involve a first-person subject, which is overt in 23 cases and null in seven cases. As such, the results neatly align with the pattern described in Chapter 4.3.3.

Once the examples with hybrid verbs are excluded, a total of 171 examples with agreeing verbs remain. Table 6.12 tabulates the subject-drop results.⁴⁰ As can be observed, both first- and third-person subjects are overt approximately two times more often than they are not.⁴¹ Still, null subjects occur with regularity: leaving aside the examples with role shift, 18 clauses with first-person referents and 27 clauses with third-person referents include a null subject.

Table 6.12: (a) Overt and (b) null subjects in clauses with regular agreeing verbs (N=171) in DGS; rs = role shift.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	34	12	First	18	3
Second	1	1	Second	3	0
Third	64	5	Third	27	3

Since Glück and Pfau (1998) have argued, following previous claims by Lillo-Martin (1986, 1991) for ASL, that null subjects in clauses with agreeing verbs are licensed by agreement marking in DGS, it is worth evaluating whether the verbs in the examples containing null subjects display the predicted agreement marking. Out of the 48 examples with a null subject (and no role shift), 46 agree or are congruent with the subject locus. There are just two examples with a null subject that are labeled ‘incongruent’; both are displayed in (29).

- (29) a. WAY_a SHOW_a O V
 ‘[God] showed [me] this path.’ [mst10-B-06:57.85]
- hs hs
- b. TAKE1.NOT \ MOTHER_{a*} TAKE1_{b*} V \ S V

⁴⁰See Chapter 2.3.5 for a description of the annotation procedure on which the analysis in this section is based.

⁴¹As Table 6.12 shows, second-person subjects occur only sporadically, so we can conclude very little about their subject-drop behavior.

'She, the mother, wasn't even allowed to keep the children.'

[sh07-A-04:43.20]

The first exception (29a) is a clause which includes the noun *WAY* and the verb *SHOW*. Notably, both signs display the same path movement. Furthermore, the sign *SHOW* also shows up in the preceding clause, again with the exact same path movement. However, that earlier instance is clearly used as a noun: it occurs in nominal position and it is accompanied by the mouthing 'Weg' ('way'). While the token in (29a) is clearly verbal – in the example, the accompanying mouthing is 'zeigen' ('to show') – it is evident that (29a) presents an atypical use of the verb *SHOW*.

The second counterexample is also nonstandard. The first instance of *TAKE1* in (29b), making up a clause on its own, lacks agreement marking. I glossed this instance of *TAKE1* as *TAKE1.NOT*, since it appears to have a negative clitic attached to it: as shown in Figure 6.17, the movement displayed in the articulation of the sign diverges from its usual specification.⁴² This movement is identical to that present in other DGS verbs that allow cliticization of the basic clause negator – typically modals (see Pfau & Quer, 2007). The addition of the clitic makes that directional movement is no longer possible. Strikingly, the negative form is immediately followed by another clause that does include a modified instance of *TAKE1* – perhaps to compensate for the lack of agreement marking with a verb that can usually be expected to be overtly marked.



Figure 6.17: A possible suppletive negative form of the verb *TAKE1*.

⁴²No other instances of *TAKE1.NOT* were attested in the data. Moreover, this particular instance received the regular ID-gloss from the DGS Corpus annotators, suggesting that the form is probably not frequent.

To sum up, subjects of all persons can be dropped in clauses with agreement verbs. When they are, the verb usually marks agreement, with the exception of two examples which I have shown have uncommon characteristics. Thus, the data do not provide strong evidence *against* the claim that subject drop is licensed by agreement marking (cf. Glück & Pfau, 1998; Lillo-Martin, 1986, 1991). Chapter 7.6 compares the subject-drop patterns in clauses with agreeing verbs to those with other verb types to establish whether the notion of agreement marking as a licenser of subject drop extends beyond agreeing verbs to other verb types.


6.3.4.2 Spatial verbs

In this section, I analyze subject-drop patterns separately for the two subtypes of spatial verbs introduced in Section 6.3.2.2 on the possibility that the patterns differ.

The properties of the subject in the examples containing the verbs GO1, GO2, or LEAVE (N=87) are tabulated in Table 6.13. As can be observed, subjects are often overt (N=56; 64.6%), but it is evident that they are also frequently null (N=31; 35.6%) – independent of the person of the referent. This is despite the fact that, as I discussed in Section 6.3.3.2, these spatial verbs do not appear to consistently mark subject agreement. While it might be tempting to argue that the initial place of articulation of these verbs, which is often close to the signer's body, triggers a first-person interpretation in the same way that body-anchored verbs do (see Chapter 4.3.3), there are two arguments against such an approach. Firstly, there are seven clear examples with a null third-person subject and a spatial verb of the type discussed here. One such example is illustrated in (30). Secondly, most body-anchored verbs are iconically motivated such that their place of articulation on the body is semantically meaningful. This does not appear to be the case with these spatial verbs.

Table 6.13: (a) Overt and (b) null subjects in clauses with the spatial verbs GO1, GO2, and LEAVE (N=87) in DGS.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	34	0	First	21	1
Second	3	0	Second	1	0
Third	18	1	Third	7	1

- (30) CL(V
 '[He] took [his things] and left.' [lei04-B-06:10.00]

The results for clauses with the spatial verbs THROW, SEND1, and BRING (N=33) are represented in Table 6.14. Again, it can be observed that subject drop is commonly permitted, even though none of the verbs marks the subject. In fact, there are more examples with (N=21; 63.6%) than without (N=12; 36.4%) subject drop. Admittedly, there are too few data points to draw strong conclusions at present, but it is evident that subject drop is allowed with verbs of this type – again, despite the fact that these verbs typically do not mark their subject.

Table 6.14: (a) Overt and (b) null subjects in clauses with the spatial verbs THROW, BRING, and SEND1 (N=33) in DGS.

(a) Overt subjects			(b) Null subjects		
Person	No rs	Rs	Person	No rs	Rs
First	6	0	First	14	1
Second	0	0	Second	0	0
Third	6	0	Third	6	0

To conclude, subject drop is freely allowed with spatial verbs of both types, despite the fact that these verbs do not mark their subjects in the same way or to the same extent that regular agreeing verbs do. As such, different mechanisms that ensure the recovery of the subject's identity must be at work for spatial verbs than for agreeing verbs (or other verb types). A formal analysis of spatial verbs taking this observation into account is presented in Chapter 8.1.

6.4 Summary

In this chapter, I investigated the formational and morphosyntactic properties of regular agreeing verbs and spatial verbs. Based on the discussion of their morphosyntactic properties in the previous section, it can be concluded that these verb types show sufficiently different behavior to warrant making a distinction between them. This will also be the premise of the formal accounts of spatial verbs and agreeing verbs that are presented in Chapters 8.1 and 8.2.2, respectively.

However, with respect to iconic form-to-meaning patterns that recur across verb forms, the distinction between agreeing and spatial verbs is less obvious: verb forms of both types may use handling handshapes, and there are also agreeing as well as spatial verb forms that lack iconically motivated handshapes yet involve an iconic movement.

I argued that the path movement or orientation change that characterizes agreeing and spatial verb forms represents a direction. Specific iconic mappings of handshape onto some event aspect may lead to an enrichment of this general mapping. With forms involving handling handshapes, for instance, the path movement represents the movement of a referent's hand(s) from one particular location to another. This still leaves open a number of options with regard to which referents or locations the initial and final places of articulation may correspond to.

Indeed, several of the mapping categories are fairly heterogeneous with respect to the semantic as well as morphosyntactic properties of their members. The category including forms with handling handshapes, for instance, includes a mix of prototypical, backward, and hybrid agreeing verbs as well as spatial verbs. Forms involving a mapping of the signer's hand(s) to body parts of perception, on the other hand, are likely to behave more uniformly, since the initial place of articulation may only be iconically tied to the possessor of these body parts, i.e. the experiencer.

As for morphosyntactic properties, I showed that regular agreeing verbs have a preference for SOV order, although SVO order is also quite common. This result is in line with previous studies on agreeing verbs in DGS (e.g. Bross & Hole, 2017; Pfau et al., 2018; Steinbach & Herrmann, 2013). Spatial verbs do not show a clear preference in terms of position of the locative constituent relative to the verb; both orders occur approximately equally often.

In terms of valency, it should come as no surprise that all agreeing verbs are

transitive or ditransitive, although some verbs may also occur in constructions with an unspecified object. Three spatial verbs (*GO1*, *GO2*, and *LEAVE*) occur in intransitive constructions with a subject and may optionally occur with a locative constituent. The other three spatial verbs in the data set (*THROW*, *BRING*, and *SEND1*) may take two arguments plus an optional locative constituent.

Agreeing verbs almost always align their initial and final places of articulation with their subject and object, suggesting that agreement marking is obligatory.⁴³ The few counterexamples that were attested, then, need alternative explanations; this merits some further investigation. This is a remarkable finding, as agreement marking has typically been considered to be optional in many sign languages.

Spatial verbs, on the other hand, show strikingly different patterns. The verbs *GO1*, *GO2*, and *LEAVE* tend to move from a locus close to the signer's body to some locus in the signing space – which has often not overtly been associated with a referent or location earlier in the discourse. At the same time, several examples in the corpus data and discussion with the two DGS informants reveal that these three verbs may also align their initial and final places of articulation with loci that are associated with referents or locations. Thus, it seems that there are several possible alignment strategies available for these verbs. The same applies to the other three spatial verb forms: although these tend to show a path movement from the locus associated with the object to some unintroduced location in the signing space, they may also align their initial or final places of articulation with the subject locus, or end their trajectory at a locus associated with a location.

Finally, the analysis of subject-drop patterns in the corpus data shows that subjects may be freely dropped both with agreeing as well as with spatial verbs. However, while the data overall support the notion that subject drop with regular agreeing verbs is licensed by agreement marking, such an analysis cannot apply to spatial verbs, since I have shown that these do not consistently mark agreement.

In Chapter 8, I argue that agreeing verbs formally agree with both their arguments, while spatial verbs do not. For the latter verb type, I propose in this chapter that they have a demonstration component which loosens the restrictions on both verb modification as well as subject drop.

⁴³ Backward verbs, of course, display the reverse pattern.

CHAPTER 7

Verb types compared

THIS chapter presents a comparison of the properties of body-anchored, neutral, agreeing, and spatial verbs in German Sign Language (DGS), described in Chapters 3 to 6. An overview of the main results from these chapters is presented in Table 7.1.

In Section 7.1, I discuss the semantic profiles of the different verb types, which I show in Section 7.2 to link into the kinds of semantic properties that are typically iconically represented in different verb forms. In Section 7.3, I scrutinize the differences and similarities between constructions containing different verb types with respect to the presence and position of arguments in the clause. Section 7.4 discusses how the different verb types may be distinguished from each other in terms of valency patterns. Section 7.5 focuses on the realization of agreement properties across different verb types. In Section 7.6, I statistically analyze subject-drop patterns with the different verb types. Collectively, the results in these sections provide the foundation for the formal analyses of DGS verbal constructions in Chapter 8.

7.1 Semantic profile

In Chapter 3, I investigated the semantic underpinnings of different verb types in DGS by semantically categorizing the 106 different verb forms in the DGS corpus data, using Malchukov's (2005) semantic map for transitivity splits in spoken languages as a tool. I refer the reader back to Figure 3.6 in Chapter 3.5 for a representation of the semantic map with the DGS verb forms occurring in the data.

The results showed that body-anchored verbs tend to denote concepts that involve an experiencer, such as events of cognition, emotion, or sensation. However, they are also attested – albeit in lower numbers – in most other semantic categories on the map, including e.g. the categories 'Interaction', 'Motion', and 'Spontaneous'. Indeed, body-anchored verbs cover the broadest range of semantic categories out of all the verb types.

Neutral verbs and regular agreeing verbs both occupy more constricted areas on the map. The former predominantly occur in the 'Effective action' and 'Affected Agent' classes on the left-most side of the map and, somewhat more sparsely, in the 'Intransitives' category on the opposite side. The latter are often verbs of interaction, but they also occur in the 'Contact', 'Effective action', 'Perception', and 'Affected Agent' classes. Spatial verbs occur in and around the 'Motion', 'Affected Agent', and 'Interaction' classes.

Table 7.1: An overview of the main findings from Chapters 3 to 6. Sections in which the relevant properties are discussed are mentioned in between brackets.

Property	Verb type			
	Body-anchored	Neutral	Agreeing	Spatial
Semantic profile	Mostly verbs of experience (3.5.2)	Action or change-of-state verbs (3.5.3)	Interaction verbs (3.5.4)	Motion verbs (3.5.4)
Formational properties	Body represents body (4.2)	Location represents referent locus (5.2)	Movement represents direction (6.2)	Movement represents direction (6.2)
(Basic) constituent order	SVO preferred (4.3.1)	SOV strongly preferred (5.3.1)	SOV preferred (6.3.1)	SVLoc or SLocV (6.3.1)
Valency patterns	Varied (4.3.2)	Varied (5.3.2)	(Di)transitive (6.3.2.1)	Intransitive or transitive; with locative adjunct (6.3.2.2)
Locus alignment	Not applicable. Fixed body-anchored articulation	Common. Alignment with structurally closest argument (5.3.3)	Consistent. Alignment with two arguments (6.3.3.1)	Rare. Locations often newly introduced (6.3.3.2)
Subject drop	Common; only with first-person subject (4.3.3)	Common (5.3.4)	Common (6.3.4.1)	Very common (6.3.4.1)

Of particular interest is the observation, discussed in Chapter 3.5.6, that there are a number of ‘hybrid’ verb forms positioned in categories where the areas occupied by the different verb types overlap. Hybrid forms such as *SEE* and *HUG1*, which have a fixed body-anchored place of articulation and a modifiable initial or final location to mark the object, occur at the border of where the area of agreeing verbs ends and the area of body-anchored verbs begins. Similarly, *MEET1* and *MEET2*, which have characteristics of both neutral and agreeing verb forms, occur at the intersection of the areas where verbs of these two types are clustered.

These results are interesting because they are compatible with the idea that verbs may change type over time (also see Engberg-Pedersen, 1993; Meir et al., 2007; Pfau et al., 2018) – and that, when they do, they do so according to certain semantic pathways as stipulated by the map. While further investigation is needed, hybrid verbs provide a first indication that there must be commonalities across the different verb types that allow for individual verb forms to move across verb type boundaries. This observation plays an important role in the formal analysis presented in Chapter 8.2.

7.2 Iconically motivated formational properties

In Chapter 3, I hypothesized that the same semantic properties that govern case-marking in spoken languages also mediate sign language verb type. I reasoned that verb semantics could affect the phonological realization of verb forms in sign languages because event properties may be iconically represented in a verb’s form.

In Chapters 4.2, 5.2, and 6.2, I subsequently identified recurring iconically motivated properties in each of the different verb types. Here, I distill from these findings which event properties tend to be reflected in sign language verb forms – and how they relate to verb type – in order to evaluate the idea above in qualitative terms.

Concerning the phonological parameter of handshape, what stands out is that (i) across the board, handshape is very frequently iconically motivated; (ii) each verb type includes forms involving various iconically motivated form-to-meaning mappings, and (iii) most iconic mapping strategies are attested for at least two verb types. For instance, across all types, there are verb forms in which the signer’s hands iconically represent hands holding an entity. As it turns out, most of these forms are classified in the ‘Effective action’, ‘Affected Agent’, ‘Reflexive/Middle’, and ‘Interaction’ categories, which are positioned toward the left (transitive) side

of the semantic map. In other words, the use of a handling handshape appears to be correlated with (semantic) transitivity. In contrast, there is no direct connection between handshape use and verb type, i.e. the one is not predictive of the other.

Importantly, however, I have also shown that a specific type of iconically motivated handshape may enrich the interpretation of a verb's phonological specifications for movement and place of articulation. For these parameters holds that they can distinguish between verb types: body-anchored verbs have a movement on, toward, or away from the body, agreeing verbs are characterized by a path movement from one location in the signing space to another, while neutral verbs lack a path movement and are articulated in neutral space.¹ I showed that the iconic interpretation of these specifications partially depends on the iconic mapping pattern involved in the handshape specification.

For instance, the use of a handling handshape with a body-anchored verb such as *EAT1* yields an iconically motivated interpretation of the hand(s), holding an object, performing an agentive action affecting the body of a referent. In turn, the signer's body comes to represent an undergoer-like argument. With other iconic mapping patterns, however, the signer's body takes on a different role.

Indeed, I showed for body-anchored verbs that different iconic mapping categories, determined based on the type of handshape mapping involved, form a continuum which reflects different degrees of involvement of the body vis-à-vis the external environment. This continuum is reflected rather nicely on the semantic map from Chapter 3.

For neutral verbs, I found that verbs that make iconic reference to two participants (e.g. with a handling handshape) tend to occur toward the left, transitive, side of the map, while verbs that reference only one participant (e.g. with a whole-entity handshape) frequently occur toward the right side. For agreeing verbs, the patterns are somewhat less clear; it appears that with these verbs, the use of a handling handshape – which is very common – creates ambiguity with respect to iconic mappings, due to there being multiple possibilities with respect to which referents are associated with the initial and final places of articulation, as well as the path movement itself.

Based on the discussion above, I conclude that iconic mapping patterns in-

¹Agreeing verbs that involve an orientation change rather than a path movement, of which there were no examples in the data set, still mark out two locations in the signing space, albeit with slightly different means.

volving handshape are predictive of the degree of semantic transitivity of verbs. Different kinds of handshapes also affect the iconic interpretation of the specifications for the other phonological parameters, which then links back to verb type. The result is that particular verb types are not more or less transitive per se, but rather that they roughly occur along different semantic dimensions, as stipulated – strikingly accurately – by Malchukov’s (2005) semantic map.

Let me conclude this section with a note on spatial verbs. In terms of iconic form-to-meaning mappings, spatial verbs use the same strategies as other agreeing verb forms – although, as I have shown, the same holds to some extent for body-anchored verbs and neutral verbs. Spatial verbs that involve just one participant (GO1, GO2, and LEAVE) all have unmarked, apparently non-iconic, handshapes and seem to merely involve an iconically motivated movement. Spatial verbs that involve two participants (THROW, SEND1, and BRING) involve hands representing hands holding an object or moving in space. Thus, based on iconically motivated properties, no principled distinction can be made between regular agreeing verbs and spatial verbs. There are, however, morphosyntactic reasons for making such a distinction; these will be highlighted in the following sections.

7.3 Presence and position of arguments

In this section, I investigate which positions different kinds of arguments (plus locative adjuncts) may occupy relative to the verb. Before entering into the discussion, I first consider how often arguments are overtly realized across the different verb types.

Table 7.2 indicates, for each verb type, the proportion of main clauses that contain the specified combinations of arguments.² Dependent clauses are excluded because arguments may be more likely to be non-overt, which may thus affect the results. Cells are highlighted when they include percentages that are noteworthy for one reason or the other; discussion follows below. The category ‘Other’ collapses rare combinations, such as S + O2 + CO or S + O + O/Loc, that occur with a percentage of 2.1% or less for all verb types. Those combinations are not discussed any further.

It can be observed from Table 7.2 that between 15 and 20% of clauses with

²I include locative constituents in the table, although I argue against the idea that such constituents function as arguments to the verb in DGS (cf. Kimmelman, 2018a, for Russian Sign Language (RSL)). They are more likely to be adjuncts.

Table 7.2: Frequencies of different combinations of overt arguments and locative adjuncts in clauses with verbs of different types in the DGS corpus data. Numbers indicate percentages.

Arguments	Body-anchored	Neutral	Agreeing	Spatial
No arguments	15.4	28.8	18.2	18.4
S	39.5	46.6	35.8	31.6
O	4.7	2.7	9.6	14.3
S + O	9.7	8.2	19.8	3.1
CO	5.9	-	0.5	-
S + CO	19.6	-	9.1	-
O/Loc	0.6	3.4	-	10.2
S + O/Loc	1.6	3.4	-	18.4
Other	3.0	6.9	7.0	4.0
	100	100	100	100

body-anchored, agreeing, and spatial verbs do not contain any overt arguments at all. Neutral verbs occur without arguments even more often: 28.8% of clauses with neutral verbs do not contain any overt arguments. This observation raises questions about the recoverability of null arguments in constructions with neutral verbs. Sections 7.5 and 7.6 explore this matter in further detail.

Clauses that contain only a subject are more or less equally common across verb types (between 31.6 and 39.8%), although neutral verbs again form an exception: 46.6% of clauses with neutral verbs contain only a (surface) subject. When clauses that include other arguments (e.g. O) in addition to a subject are added to these percentages, the results reveal more substantial differences in the frequency of subject realization across verb types. Clauses with body-anchored verbs most often occur with a subject (70.5% of clauses), followed by agreeing verbs (68.4%) and neutral verbs (61.0%), with spatial verbs taking a subject least often (55.1%). Section 7.6 presents an analysis of subject-drop patterns across verb types.

Clauses with agreeing verbs most often contain an overt direct object (31.5%), followed by clauses with spatial (19.4%), neutral (17.1%), and body-anchored (14.4%) verbs.³ Since agreeing verbs denote (di)transitive concepts by definition, it is hardly surprising that object realization is most common for this verb type. Still, the majority of clauses with agreeing verbs do *not* contain an overt direct

³These percentages have been calculated by pooling together the categories 'O' and 'S + O' in Table 7.2, in addition to categories collapsed under 'Other' that include a direct object.

object, meaning that object drop is common.⁴ In fact, it is much more common than subject drop.

Of the clauses that contain a spatial verb and an overt direct object, the majority lack a subject (73.7%). In comparison, for all other verb types holds that clauses that contain both a subject and an object occur more often than clauses with an object only. This observation seems to suggest that there are certain pressures at work for constructions with spatial verbs to include no more than a single overt argument.⁵ If so, then that might speak in favor of the view that locative constituents are *not* arguments, since as much as 66.7% of the spatial-verb constructions including such a constituent also contain a subject.

Constructions with different verb types also display some differences with respect to the position of arguments relative to the verb, in particular regarding the position of the direct object. The position of subjects, clausal complements, and locative adjuncts are more uniform across verb types, although there are also subtle differences.⁶

Firstly, Table 7.3 represents frequency information on the position of the subject relative to the verb across verb types.⁷ Unsurprisingly, the results indicate that the canonical position of the subject is preverbal, independent of verb type. Examples with V S order, as well as examples with a verb sandwiched in between two iterations of the subject, or vice versa, are much rarer.

Interestingly, V S order is somewhat more common in clauses with body-anchored verbs (16.3%) than in clauses with other verb types (5.5% or less). Scrutiny of the relevant examples with body-anchored verbs reveals that in almost all of these cases, the subject is directly adjacent to the verb. In addition, the body-anchored verbs that most frequently occur in clauses with a postverbal subject are KNOW1 (N=10), KNOW2 (N=13), BE-DEAF (N=6), and SAY1 (N=5).⁸ These forms

⁴Overt indirect objects are also very uncommon with agreeing verbs; just 6.4% of the clauses with agreeing verbs include an indirect object. The examples do not show up in Table 7.2 because they are all subsumed under the 'other' category.

⁵Indeed, in Chapter 8.1, I argue that spatial verbs have a demonstration component which leads to a relaxation of the rules concerning the licensing of argument drop. This view seems compatible with the observation that spatial verbs generally occur with at most one argument.

⁶There were too few examples with indirect objects in the data set to analyze them properly; I thus leave them out of the discussion.

⁷In the calculations for neutral verbs, I treat arguments labeled S/O, i.e. the more subject-like arguments of symmetric verbs, like regular subjects. The same applies to O/S arguments, which are treated as direct objects below.

⁸It needs to be remarked, however, that these four verb forms also occur rather fre-

Table 7.3: Position of the subject relative to the verb across verb types.

Order	Body-anchored	Neutral	Agreeing	Spatial
S V	77.8	93.3	90.6	94.4
V S	16.3	2.2	5.5	5.6
Sandwich	5.9	4.5	3.9	-
	100	100	100	100

have in common that they have a place of articulation on the signer's head. Perhaps, then, there is a phonological preference for downward rather than upward movement, such that the subject – a pronominal index in most cases – is more likely to occur in postverbal position with body-anchored verbs articulated on the head than with verbs that are articulated on the horizontal plane. Another possibility, which has previously been suggested for Sign Language of the Netherlands (NGT; Crasborn, van der Kooij, & Ros, 2012), is that these verb forms are prosodically light and therefore require some additional light material – like a pronominal pointing sign – to follow it, under the assumption that the final prosodic word in the clause needs to be prosodically heavy. Both suggestions are purely speculative at this point, but they offer some potentially interesting avenues for future research.

As shown in Table 7.4, the direct object favors a preverbal position for all verb types except for body-anchored verbs, which prefer postverbal objects.⁹ I should point out, however, that the preverbal preference for objects in constructions with agreeing verbs is relatively weak, as 33.9% of examples include a postverbal object. In clauses with neutral verbs, on the other hand, just 3.9% of examples display VO order, although I should remark that just 26 examples with neutral verbs include an overt direct object.

The results presented above show that DGS patterns like many other sign languages with respect to constituent order: body-anchored (or 'plain' verbs) have a tendency to occur in clauses with SVO order, while modifiable verbs usually occur in SOV constructions (see Napoli & Sutton-Spence, 2014, among others).

quently in the data compared to many other body-anchored verb forms. Thus, further research is necessary to determine whether the relative high frequency of V S orders with these verbs reflects a genuine pattern.

⁹Note also that O \ V is included as a separate order in Table 7.4. For such clauses with a sentence-initial direct object followed by a prosodic boundary, it is likely that topicalization has occurred.

Table 7.4: Position of the direct object relative to the verb across verb types.

Order	Body-anchored	Neutral	Agreeing	Spatial
O V	25.0	76.9	61.0	84.1
O \ V	11.3	11.5	1.7	5.3
V O	57.5	3.9	33.9	5.3
Sandwich	6.2	7.7	3.4	5.3
	100	100	100	100

The frequency data regarding the position of embedded clauses (abbreviated as CO for 'clausal object', following the annotation guidelines for the corpus data) in relation to the verb are displayed in Table 7.5. There are few surprises here; only (some) body-anchored verbs and agreeing verbs may take clausal complements, and such complements tend to follow rather than precede the main verb.

Table 7.5: Position of the clausal complement relative to the verb across verb types.

Order	Body-anchored	Neutral	Agreeing	Spatial
V CO	87.0	-	91.0	-
CO V	8.4	-	4.5	-
Sandwich	4.6	-	4.5	-
	100	100	100	100

Finally, Table 7.6 presents the frequency data for the position of locative adjuncts vis-à-vis the verb in clauses with verb types that may occur with this kind of constituent. The patterns for body-anchored verbs and neutral verbs are similar. As for spatial verbs, pre- and postverbal position of the locative constituent are equally common.

Table 7.6: Position of the locative constituent relative to the verb across verb types.

Order	Body-anchored	Neutral	Agreeing	Spatial
O/Loc V	27.3	23.1	-	40.0
O/Loc \ V	-	-	-	3.3
V O/Loc	63.6	69.2	-	40.0
Sandwich	9.1	7.7	-	16.7
	100	100	100	100

Again, let me reiterate from previous chapters that there is a qualitative difference between locative constituents and direct objects with respect to their pre-

ferred position, except in clauses with body-anchored verbs: O V order is clearly more common in constructions with neutral verbs and spatial verbs (see Table 7.4), while O/Loc V order does not enjoy a clear preference for either verb type. This finding presents further support for the notion that locative constituents do not behave like direct objects but rather function as adjuncts.

7.4 Valency

The results reported in Chapters 4.3.2, 5.3.2, and 6.3.2 show that verb forms of all types display considerable variation in terms of valency.

Many of the body-anchored verbs in the DGS corpus data occur in intransitive constructions, with some forms participating in the unspecified-object alternation and thus optionally allowing for an object. Still, there are a number of body-anchored verbs that occur exclusively in (di)transitive constructions, and yet other forms occur with clausal complements. Neutral verbs show similar variation: some are intransitive, some may participate in unspecified-object or (possibly) causative-inchoative alternations, some are transitive, and yet others are ditransitive. In addition, the five weather verbs in the data set – which are all neutral verbs – do not take any arguments.

Unsurprisingly, agreeing verbs show more uniform behavior, since they express double-argument agreement. All regular agreeing verbs are transitive or ditransitive, with some verbs allowing clausal complements. The corpus data indicated that the ditransitive verbs in the data set may also be used mono-transitively, in which case there is no recipient argument, and the verb uses the center of the signing space as a default final place of articulation. For spatial verbs, a distinction can be made between intransitive and transitive forms. Both types of forms, of course, may additionally co-occur with locative adjuncts, which I argued do not have argumental status.

Thus, it can be concluded that – apart from the fact that agreeing verbs are at least bivalent – there is no strong relation between valency and verb type.

7.5 Locus alignment

As discussed at various points throughout this dissertation, the potential for modification of (some) verbs in sign languages to align with their arguments has been

a popular research topic for decades, and it has also motivated Padden's (1988) much-cited tripartite classification of verbs in American Sign Language.

For the verb types that have the potential to be modified, i.e. neutral, agreeing, and spatial verbs, there is disagreement in the literature about whether verb modification resulting in locus alignment is an expression of the same grammatical mechanism of agreement in all cases. In particular, theoretical debates have centered around three main questions: (i) do agreeing verbs express genuine agreement or merely 'indicate' their arguments; (ii) should a principled distinction be made between spatial verbs and agreeing verbs; (iii) should the localization of neutral verbs be considered an expression of agreement?¹⁰ What can the analysis of the DGS corpus data contribute to these debates?

In the data, regular agreeing verbs show the familiar behavior of aligning with the loci of both their subject and object. In fact, and rather strikingly, verb alignment turned out to be the rule rather than the exception. While previous corpus-based studies have testified to the optionality of argument marking through locus alignment in several sign languages (de Beuzeville et al., 2009; Fenlon et al., 2018; Legeland, 2016), I only found a handful of examples in the DGS data where the place of articulation of the verb is clearly incongruent with that of the referent it is expected to align with.

All together, 92.4% of all agreeing verb tokens in the DGS corpus data are at least congruent with their subject, and 94.4% are at least congruent with their object. It is important here to reiterate that congruence does not necessarily mean that a verb actually expresses agreement. Recall that congruence arises either when the place of articulation of the verb could be influenced by that of the preceding sign, or when a referent is assigned a locus at or close to the center of the signing space and the verb is articulated at this same location. Still, de Beuzeville et al. (2009) and Fenlon et al. (2018) both classify cases of the latter (which are also more common in the DGS data) as congruent, as well. Yet, the proportions of agreeing plus congruent tokens reported for Australian Sign Language and British Sign Language (BSL) data, respectively, are considerably lower than what I report for DGS.

An interesting observation made by Fenlon et al. (2018) is that third-person agreement marking in BSL is rarer than first-person (as well as second-person)

¹⁰I refer the reader back to Chapters 5.1 and 6.1 for more thorough discussions of the relevant literature.

agreement marking.¹¹ In their data, the verb does not align with the locus of a third-person agent (equivalent to what I label subject) in 48.1% of all cases. First-person agents, on the other hand, are unmarked by the verb in just 5% of cases.

The DGS corpus data indicate that an absence of agreement marking with a third-person subject is somewhat more common than a lack of first-person subject agreement marking, although the effect should not be overstated.¹² Of the clauses with an agreeing verb that contain a third-person subject, 11.8% of examples are analyzed as either incongruent or unclear (i.e. the verb is articulated at the center of the signing space, and the relevant argument has not been localized).

Overall, with so few verb tokens that clearly show no alignment in their places of articulation with those of their arguments – and knowing that corpus data can generally be expected to yield some exceptions to any rule – it seems reasonable enough to conclude that agreement marking on DGS agreeing verbs is obligatory – both with subjects and with objects – unless special circumstances overrule this requirement. The exact nature of those exceptional circumstances needs to be researched more thoroughly in future work.

For neutral verbs, the picture looks quite different. As discussed in detail in Chapter 5.3.3, very few instances of clauses with neutral verbs show unambiguous localization. The only verb form that regularly localizes at a locus on the signer's left or right, *DIE1*, takes one argument which is necessarily animate. Four other intransitive verb forms (*LIVE3*, *PLAY1*, *HIDE*, and *SIT*) involve exclusively animate referents, too, but these verb forms cannot be properly evaluated with respect to their localizing abilities for two different reasons. Firstly, *LIVE3*, *SIT* and *PLAY1* may be better reclassified as body-anchored verb forms, given that their place of articulation directly in front of the signer appears to be fixed. Secondly, *HIDE* does not occur frequently enough in the corpus data to assess its localization abilities.

All other neutral verbs can occur with an external argument, which is typi-

¹¹This pattern seems to be compatible with the classic distinction between first and second vs. third person in spoken languages. However, let me point out that some sign linguists (most notably Meier, 1990) have rather argued for a first vs. non-first person distinction in sign languages based on the fact that only first-person pronouns have a fixed place of articulation. This insight also plays a key role in the theoretical account I propose for DGS in Chapter 8.2.

¹²I only consider subject agreement marking, as I did not make annotations that indicate grammatical person of the object.

cally animate, as well as an inanimate internal argument. Importantly, both the corpus data and the judgments from two DGS informants indicate that inanimate arguments are generally not localized at some locus on the signer's left or right, instead regularly being associated with the center of the signing space. Indeed, neutral verbs that take an inanimate argument as their object or, in inchoative constructions, (surface) subject, tend to be congruent with that argument's central place of articulation.

The question is whether such congruence in the place of articulation at the center of the signing space should be analyzed as an expression of agreement. As discussed in Chapter 5.3.3, an important argument that speaks in favor of such a perspective is that neutral verbs in unergative constructions with an agentive animate argument may be localized at that argument's locus. A small number of such examples is attested in the corpus; two of them are repeated in (1).¹³ The two informants confirmed that such examples are grammatical.

- (1) a. **COOK1**_a HOW V
 'How does [he] cook?' [hh01-B-07:11.25]
- b. INDEX₁ MOTHER **COOK1**_a [...] WOMAN INDEX_b **COOK1**_b S V [...] S V
 'My mother always cooked [...] now my wife cooks.'
 [hh01-A-06:48.65]

From the above observation, I deduce that alignment of a neutral verb with an *internal* argument at the center of the signing space should be analyzed as agreement marking: were it not, then one would expect neutral verbs in transitive constructions to be free to localize at the locus associated with the external, generally animate, argument – but this is not the case. Indeed, there are no transitive constructions with **COOK1** where the verb localizes at the external argument's locus.

Since both neutral verbs and agreeing verbs may be modified to align with loci associated with arguments, I do not see why this mechanism should not be treated on equal terms, that is, as manifestations of agreement. The difference between the two verb types is that neutral verbs are apparently phonologically constrained, such that they can only express agreement with a single argument. This view is in accordance with that expressed by Lourenço (2018) and Lourenço and Wilbur (2018) based on data from Brazilian Sign Language (Libras), and

¹³Note that in (1b), the localization of both instances of **COOK1** appears to serve to express a direct contrast.

it is a perspective which is incorporated into the formal analysis of neutral verb constructions in Chapter 8.2.3.

Spatial verbs behave quite differently from agreeing verbs and neutral verbs in terms of locus alignment properties. I discussed in Chapter 6.3 that the six spatial verb forms in the data set can be divided across two categories based on their morphosyntactic characteristics, including alignment properties. GO1, GO2, and LEAVE, which are intransitive, frequently begin their trajectory at a location close to the signer – even when the subject is a third-person referent – and end their movement at a location in any possible direction. In the majority of cases, this final place of articulation has not been previously introduced in the discourse.

In contrast, the verbs BRING, SEND1, and THROW, which are transitive, tend to start their trajectory at the locus associated with the patientive argument, which I analyze as a (direct) object. Based on this observation, one could argue that these verbs therefore express object agreement. However, it is rather unexpected that these verbs may align with the object locus at the *beginning* of their trajectory: with agreeing verbs, object marking occurs at the verb's final location. Backward agreeing verbs form an exception. However, such verbs mark their subjects at the end of their path movement – which is something that these spatial verbs cannot do: as with the other three spatial verbs, the final place of articulation may be anywhere in the signing space.

For spatial verbs of both types holds that deviations to the patterns described above are also attested. Since this observation has significant bearing on the analysis of spatial verbs I propose in Chapter 8.1, a more thorough description of these other possibilities is postponed until then.

Based on the observations above, it appears that – in contrast to what e.g. Janis (1992) and de Quadros and Quer (2008) have argued for – there are morphosyntactic grounds for making a principled distinction between spatial and agreeing verbs, as the properties of the path movement that characterizes both verb types are not quite the same. This idea is developed further in Chapter 8.1, in which I also present a number of additional arguments in support of the conclusion that spatial verbs and agreeing verbs are distinct verb types.

7.6 Subject drop

All verb types allow for subject drop. As Table 7.7 shows, body-anchored, neutral, and agreeing verbs, as well as the spatial verbs GO1, GO2, and LEAVE, occur

with null subjects approximately equally often, i.e. around 30-35% of the time. The spatial verbs *THROW*, *BRING*, and *SEND1* occur with null subjects much more frequently, namely in 63.6% of the cases. In Chapter 8.1, I argue that this high proportion of dropped subjects provides an important piece of support for the perspective that these verbs have more in common with classifier predicates than with agreeing verbs. I do not discuss spatial verbs any further in this section.

Table 7.7: Frequency of subject drop across verb types.

Verb type	Overt	Null
Body-anchored	399 (71.9%)	156 (28.1%)
Neutral	118 (65.2%)	63 (34.8%)
Agreeing	117 (68.4%)	54 (31.6%)
Spatial: <i>GO1</i> , <i>GO2</i> , <i>LEAVE</i> ...	56 (64.4%)	31 (35.6%)
Spatial: <i>BRING</i> , <i>THROW</i> , <i>SEND1</i> ...	12 (36.4%)	21 (63.6%)

Table 7.8 compares body-anchored, neutral, and agreeing verbs with respect to the distribution of overt and null subjects across grammatical person.¹⁴ Clauses with action role shift are excluded from the analysis for two reasons. Firstly, relatively few examples include role shift, such that it is difficult to draw any clear empirical conclusions from or apply statistical models to the frequency numbers. Secondly, in constructions under role shift, the interpretation of person in the local context differs from that in the global context. In determining the person of subjects in the corpus examples, I always considered the global context, in which the subject may be interpreted as first, second, or third person. Within the local context, on the other hand, the interpretation of the subject is always first person. This is a crucial point, since I hypothesize, following previous work on NGT (Oomen, 2017), that body-anchored verbs only allow first-person drop. That is, when role-shift markers are present, a third-person subject is interpreted as a first-person subject in the local context, such that subject drop is predicted to be perfectly allowed. Indeed, as far as can be observed, the corpus data bear this out.

The raw numbers in Table 7.8 already show a difference in absolute numbers for null third-person subjects in constructions with body-anchored (N=10) versus neutral (N=20) or agreeing (N=27) verbs. Indeed, this difference becomes

¹⁴The examples with the hybrid verbs *SEE*, *HUG1*, and *SMELL1*, classified as agreeing verbs, are excluded from counts in the table, because these verbs are categorized as agreeing yet have a fixed place of articulation on the body where subject marking would otherwise be expected. As such, in terms of subject agreement, these verbs behave more like body-anchored forms.

Table 7.8: (a) Overt and (b) null subjects of different persons in clauses with body-anchored, neutral, and agreeing verbs.

(a) Overt subjects				(b) Null subjects			
Person	Body	Neut.	Agr.	Person	Body	Neut.	Agr.
First	175	40	34	First	105	33	18
Second	36	6	1	Second	8	4	3
Third	135	61	64	Third	10	20	27
	346	107	99		123	57	48

even more pronounced when one considers that there are overall more examples with body-anchored verbs (N=469) than with neutral (N=164) and agreeing verbs (N=147).

In order to confirm that these observations also hold up against statistical scrutiny, I applied a statistical analysis to investigate whether the odds of occurrence of third-person subject drop with body-anchored verbs are, indeed, significantly lower than with neutral and agreeing verbs.¹⁵ My predictions are the following:

- In clauses with body-anchored verbs in the absence of role shift, first-person subjects can be non-overt but third-person subjects have to be overt.¹⁶
- In clauses with neutral and agreeing verbs, in the absence of role shift, subjects of any person can be non-overt.

For neutral verbs and agreeing verbs, the rationale is that such forms do not have a default association with any person, such that no particular interpretation is forced in the absence of an overt subject. Thus, the null hypothesis is that null subjects are allowed for any person with these verb types. In Chapters 8.2.2 and 8.2.3, I discuss how null subjects are licensed with verbs of these types.

Before I discuss the statistical model, a comment about second-person subjects is in order. Some researchers (e.g. Engberg-Pedersen, 1993; Hou & Meier, 2018; Meier, 1990; Rathmann & Mathur, 2002) have claimed that sign languages

¹⁵A similar statistical analysis was applied – both to DGS and RSL – in Oomen and Kimmelman (2019), although agreeing verbs were not considered in that study. Vadim Kimmelman carried out the statistical analysis for that study, and helped with preparing the analysis for the present study, as well. Part of the text that follows in this section also appears in a slightly different version in Oomen and Kimmelman (2019).

¹⁶Second person is discussed below.

only make a first versus non-first person distinction, as non-first person referents can, in principle, be localized anywhere in the signing space.¹⁷ I too subscribe to this idea, which inescapably means that null second-person subjects are also hypothesized to be disallowed in clauses with body-anchored verbs. However, only a small number of examples in the data set contain a second-person subject, making it impossible to include these examples in the statistical analysis. As discussed in Chapter 4.3.3, scrutiny of the relevant examples reveals that null second-person subjects do occur, but only in interrogative constructions, which I tentatively concluded are independent licensors of subject drop. In declarative constructions with body-anchored verbs, however, the hypothesis that null second-person subjects are not allowed can be maintained based on the available data, but further investigation is required. I leave this issue aside for now, although I briefly revisit it in Chapter 8.2.1.7 after I have set out my general formal account for body-anchored verb constructions.

The prediction in 7.6 is categorical. That is, examples with non-overt third-person subjects with body-anchored verbs are predicted not to occur in DGS. However, naturalistic corpus data almost never present a clear-cut picture of any phenomenon, and other factors may be at play that might lead to a less-than-perfect result (McEnery & Hardie, 2012). Therefore, a more realistic expectation is that there are significant differences between the different verb types in the data. In other words, even if there are some examples with third-person null subjects and body-anchored verbs, the interaction of verb type is hypothesized to be a significant factor in predicting the occurrence of such subjects.

To test the predictions, I applied a mixed effects linear regression (Bates, Mächler, Bolker, & Walker, 2015). Specifically, I created a model to predict the occurrence of non-overt third person subjects, which I label as 3N (as opposed to any other options), based on verb type. I first set up contrasts between agreeing verbs (+1/2) and neutral verbs (-1/2), as well as between body-anchored (-1/3) vs. agreeing (+1/3) and neutral verbs (+1/3). The expectations were that there is no significant difference in likelihood of 3N in the former case, but there is a significant difference in the latter case. In the model, I then took verb type as the predictor, and I added data file and verb form as random intercepts. The statistical analysis was done in R (R Core Team, 2016) using the *lme4* package for mixed effects binomial linear regression (Bates et al., 2015). The model is represented in (2).

¹⁷See also Alibašić Ciciliani and Wilbur (2006) for an alternative theory.

(2) 3N ~Verb type + (1|File) + (1|Verb)

According to prediction, the results do not provide evidence for a difference in the likelihood of a non-overt third person subject between agreeing and neutral verbs (estimated odds ratio: 2.6, 95% CI: 0.8-9.8, p-value = 0.11). There is a significant difference between body-anchored verbs and the two other groups (estimated odds ratio 24.4, 95% CI 5.7-144.6, p-value < 0.001). In other words, I can conclude that the odds of occurrence of a non-overt third-person subject are significantly lower for body-anchored verbs than for the other verb types. The results are thus fully consistent with the expectations.

Based on the statistical analysis, as well as the detailed analysis of the counterexamples in Chapter 4.3.3, I conclude that null non-first person subjects with body-anchored verbs are disallowed, while they are perfectly fine with neutral and agreeing verbs. This conclusion plays an important role in the formal analysis I propose in Chapter 8.2, in which I present a unified account of body-anchored, agreeing, and neutral verbs based on the idea that each of these verb types involves grammatical agreement.

CHAPTER 8

Formal analyses for verb types in DGS

THE goal of this chapter is to tie together all the separate lines of investigation set out in Chapters 3 to 7 by developing formal accounts that are able to capture as much of the individual properties of the different verb types as possible.

In Chapter 7, I systematically compared the main findings for each of the verb types previously reported in Chapters 3 to 6. The discussion showed that – despite there being notable differences – body-anchored, neutral, and regular agreeing verbs share a number of important properties, whereas spatial verbs stand out in several respects. The latter are therefore discussed separately in Section 8.1.

For body-anchored, neutral, and agreeing verbs, I develop a unified analysis in Section 8.2. The primary motivation for attempting such a feat is that the boundaries between verb types are demonstrably fuzzy – an observation which has been made numerous times for a variety of sign languages, and which has also played a central role throughout the various chapters in this dissertation. I argue that body-anchored, neutral, and agreeing verbs are all in a grammatical agreement relation with their argument(s). However, different – partially iconically motivated – formational properties lead to differences with respect to which grammatical feature specifications are associated with the verb and/or how the agreement relation is overtly expressed.

Section 8.3 discusses some outstanding issues related to the analysis in Section 8.2; Section 8.4 concludes the chapter.

8.1 Spatial verbs: an analysis

While Padden (1988) makes an original distinction between agreeing verbs and spatial verbs based on the fact that the former agree with arguments in person and number while the latter agree with locations, others (de Quadros & Quer, 2008; Janis, 1992, 1995) have since argued that the two verb types should be subsumed under a single category on the grounds that the morphological means to realize this agreement is the same. In addition, de Quadros and Quer (2008) point out that some verbs are ‘fuzzy’ in that they may sometimes agree with locations, and sometimes with referents.

While the latter observation certainly holds true for some of the spatial verbs in the DGS data set, I believe there are several good reasons to maintain that spatial verbs and agreeing verbs belong in separate classes. I should immediately add that the categorization of semantically fuzzy verbs needs to be determined on a case-by-case basis by scrutinizing their morphosyntactic properties. The discus-

sion of the six spatial verbs in the DGS data – some of which also involve a certain degree of fuzziness – offers some indications as to how to arrive at such an assessment. In Section 8.1.1, I show which properties of spatial verbs lead me to propose in Section 8.1.2 that these verbs involve demonstration, causing a relaxation of certain grammatical rules that do apply to agreeing verbs.

8.1.1 Properties of spatial verbs

As I discussed in Chapter 6.3, the six spatial verbs in the DGS data set can be divided into two categories based on several properties. Firstly, GO1, GO2, and LEAVE are spatial verbs that take a single argument, while BRING, THROW, and SEND1 may take two. All spatial verbs, of course, may also co-occur with locative adjuncts. Secondly, the former three verbs are characterized by non-iconic handshapes, while the latter three involve handling handshapes or otherwise iconically-motivated hand configurations. Thirdly, BRING, THROW, and SEND1 occur with null subjects almost twice as often as GO1, GO2, and LEAVE (63.6% vs. 35.6%), which pattern more like the other verb types in this respect. These differences warrant a slightly different treatment of the two subtypes of spatial verbs, although I propose in Section 8.1.2 that there is a common denominator: all spatial verbs have a demonstration component.

The forms BRING, SEND1, and THROW have a number of properties which suggests that they actually behave like classifier predicates.¹ Indeed, the forms THROW and BRING both involve handling handshapes. While this alone is not a sufficient condition for treating them as classifier predicates, as there are also many lexical verbs that involve a classifier handshape, it is at least compatible with such an analysis. Another hallmark of classifiers is that the handshape may change depending on the shape and size of the handled object; indeed, the examples in the corpus data show that the aperture of the hands at the beginning (BRING) or end (THROW) of the articulation of these forms is modifiable. SEND1 does not have a handling handshape but involves a hand-to-hand mapping, thus making it more like a body-part classifier. This handshape cannot be modified.²

Furthermore, there is variation attested in hand orientation. The verb BRING,

¹In treating these forms as lexical verbs, I followed the direction of the DGS Corpus team, who used ID-glosses for these verb forms rather than the label \$MAN*, which is used for classifier predicates.

²An alternative analysis for SEND1 is that it is actually used gesturally, as in some hearing cultures. I put this issue aside for now.

for instance, is variably articulated with the hands directed upward, downward, or facing each other. An instance of BRING in which the hands have a downward orientation is displayed in Figure 8.1; the example in which the verb occurs is represented in (1), reproduced from (26) in Chapter 6.3.3.2.

- (1) WITH POSS₁ CHILD_{++a} CLEAR POSS₁ **BRING**_{b*} O V
 '[I] would take my children with me.' [koe20-A-04:35.60]



Figure 8.1: A token of the verb BRING with a downward orientation of the hands, and a movement trajectory characteristic of a classifier predicate.

In addition, the corpus data show that the movement trajectories of the three forms may be modified in ways that are more characteristic of classifier predicates than of lexical signs. This is also illustrated by the instance of BRING in Figure 8.1: as indicated by the arrows, the signer's hands move from the signer's right toward her chest, and then slightly away from the signer. Lexical verbs would be expected to show a single straight movement.

The above observations provide sufficient empirical ground to consider a classifier analysis for these forms. There is one additional observation that speaks in favor of such an approach, and which also serves as an important argument for maintaining a distinction between spatial verbs and regular agreeing verbs, since it applies to the spatial verbs GO1, GO2, and LEAVE, too. That is, the corpus data, as well as the discussions with the two DGS informants, attest to some interesting variation regarding the type of locations the three verbs may align with at the beginning and end of their trajectories.

BRING, THROW, and SEND1 frequently start their trajectory at a locus associated with a patientive referent, which is analyzed as a direct object. This is noteworthy in itself, since it contrasts with the behavior of regular agreeing verbs,

but even more interesting is that there are other options available.³ For instance, in several cases in the corpus data, the initial place of articulation aligns with the subject rather than the object locus. There is also at least one clear example showing alignment with a previously introduced location. Although further experimental testing is needed to determine and verify all the different options, it is evident that at least some flexibility is allowed with respect to the type of locus these spatial verbs may align with at the beginning of their trajectory.

This flexibility is also evident in the final places of articulation of instances of BRING, THROW, and SEND1. Signers tend to end the path movement of these verbs at a seemingly random location toward the edge of the signing space which has typically not been previously introduced into the discourse, as in the two examples in (2), illustrated in Figure 8.2. Recall that in the examples in (2a), the star following the locus subscript indicates that the locus is newly introduced.

- (2) a. DRESS **THROW**_{a*}
 'I put away the dress.' [koe17b-A-01:46.55]
- b. POSS1 FATHER WANT \ INDEX₁ **SEND1**_{a*} HIGH SCHOOL
 'My father wanted to send me off to college.' [mst16-B-01:41.85]



(a)



(b)

Figure 8.2: The final places of articulation of (a) THROW from (2a) and (b) SEND1 from (2b).

However, it also seems possible for the final place of articulation to be aligned with a location (3a) or a referent (3b) representing the goal or recipient of the event denoted by the verb, although I should note that the corpus data included

³A theoretical possibility, of course, is that these spatial forms are actually backward verbs, but this seems implausible given the fact that the final place of articulation of these spatial verbs hardly ever corresponds to the subject locus; see below.

just a handful of such instances.⁴ In (3a), the final place of articulation of **BRING** corresponds to the locus assigned to ‘America’, referred to by means of the pointing sign at the end of the clause. As can be observed in Figure 8.3a, this location is rather high up in the signing space, as if to signal that America is far away from where the signer is sitting.⁵ Example (3b) looks similar to (3a): the final place of articulation of the verb **SEND1** aligns with a locus in the signing space that had previously been associated with a location, namely China. However, it appears that this locus is being re-used as a referent locus in the first clause in (3b) by means of a mechanism that Schlenker (2018a) calls ‘locative shift’. As such, the final place of articulation of **SEND1** can be said to align with a locus which doubles as both a location (‘China’) and a referent (‘the Chinese’). Figure 8.3b illustrates the final place of articulation of the sign, which is again higher up in the signing space than usual.⁶

- (3) a. $\text{INDEX}_a (a) \mathbf{BRING}_b \text{INDEX}_b$
 ‘He took [everything] with him to there [America].’ [koe05-03:39.10]
- b. $\overline{\text{INDEX}_a \text{PRODUCTION DONE}} \overset{\text{re}}{\backslash} \text{INDEX}_a \text{WITH } a \mathbf{SEND1}_b \text{INDEX}_a$
 ‘When they [Chinese] were done with the production, they returned [the products to the Germans] [...] They sent them back to China/the Chinese again.’ [goe05-A-12:46.90]

Interestingly, the spatial verbs **GO1**, **GO2**, and **LEAVE** show similar patterns in terms of their alignment properties at the final place of articulation. With respect to the initial place of articulation, the corpus data indicate that signers typically start from a place close to the body – even when the subject is not first person. Nonetheless, both DGS informants claim that it is also possible for these verbs to show alignment with a (non-first person) subject locus, again illustrating that there is flexibility in the strategies signers may adopt.

⁴In such cases, one might argue that a spatial verb behaves like a backward verb involving a path movement from source to goal. However, the flexibility in locus alignment of spatial verbs, combined with an apparent lack of grammatical restrictions on subject drop (see below), lead me to a different proposal in Section 8.1.2.

⁵Another possibility is that the signer takes geographical knowledge into account to determine the final place of articulation of spatial verbs, but this is difficult to establish based on corpus data alone. Of interest to note in this context is that Perniss (2007) demonstrates that DGS signers tend not to use an absolute (i.e. geocentric) frame of reference when making reference to spatial relations. Not much hinges on this point.

⁶In establishing the final place of articulation of the sign, I only considered the signer’s dominant hand, which is his right hand (left in the picture).

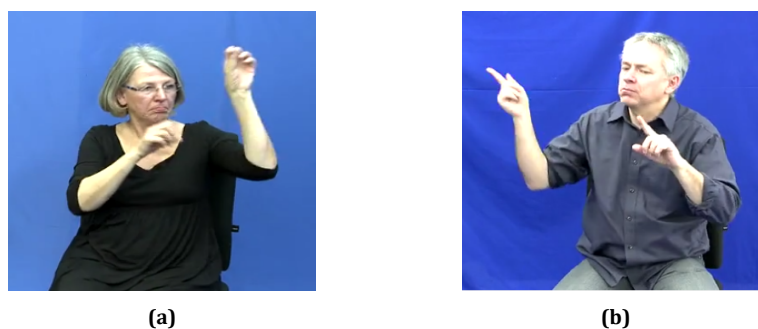


Figure 8.3: The final places of articulation of (a) BRING from (3a) and (b) SEND1 from (3b).

Several such options are illustrated in the constructed examples (4), all including the verb GO1. In (4a), the final place of articulation of the verb occurs at a seemingly random location at the edge of the signing space.⁷ The path movement, then, indicates that a referent or entity moves from a place close by to a place further away. In (4b), the initial and final places of articulation of the verb are associated with locations, conveying that a referent or entity moves from a location *a* to a location *b*. Finally, the spatial verb's path movement may also move from one referent locus to another, as in (4c). Combinations of these options are also possible.

- (4) a. SCHOOL_c \ INDEX_a GO1_{b*}
'He went to school.'
- b. GÖTTINGEN_a AMSTERDAM_b \ INDEX_{1 a} GO1_b
'I went from Göttingen to Amsterdam.'
- c. FRIEND INDEX_a \ INDEX_{1 1} GO1_a
'I went to my friend.'

To sum up, there are several competing options available to signers when considering what the path movement of spatial verbs may convey. As it happens, De Quadros and Quer (2008) describe similar patterns for Libras; the observation that (some) spatial verbs may sometimes align with referent loci in fact leads

⁷Again, an alternative possibility is that the signer takes geographical knowledge into account when deciding where to end a spatial verb's trajectory. Still, it seems that the signer does not *have* to make use of absolute space in order for the construction to be interpretable.

them to conclude that there is no clear-cut distinction between agreeing and spatial verbs. An important argument in support of their claim is that it is not possible in Libras to drop an argument when the spatial verb does not align with its referent locus. However, it is clear that the same restriction does not apply to DGS: in the corpus data, seven out of the 87 examples with the verbs GO1, GO2, and LEAVE include a null non-first person subject while the spatial verb has an initial place of articulation close to the signer. As for the verbs BRING, THROW, and SEND1, it is even clearer that de Quadros and Quer's (2008) conclusion does not hold: these verbs hardly ever align with the locus of the subject, yet subjects of any person are regularly dropped.

I arrive at the opposite conclusion to de Quadros and Quer's: the flexibility that spatial verbs show indicates that the path movement does not have a grammatical function, but rather serves to *demonstrate* movement from one place to another (following Davidson, 2015; see next section).⁸ The path movement in agreeing verbs, on the other hand, has the purely grammatical function of marking agreement. This view is in line with Pfau et al. (2018, p. 18), who state that "As for unifying spatial verbs with agreement verbs, while a unification may surely seem attractive, it must be pointed out that path movement has very different meanings in the two verb classes: with spatial verbs, it denotes actual movement of a referent from one location to another ...[I]nterpreting the path movement in agreement verbs as literal movement frequently fails, namely in those cases where the verb does not denote transfer." In the next section, I discuss how the notion of demonstration may be applied to spatial verbs in DGS.

8.1.2 Spatial verbs are demonstration verbs

I concluded in the previous section that all six spatial verbs in the DGS data set demonstrate spatial movement of some entity or referent.⁹ At the very minimum, what is demonstrated is movement from *a* to *b*, where *a* and *b* represent locations. The loci in the signing space representing these locations may be determined ran-

⁸In fact, a similar perspective is expressed by Padden (1990, p. 123), who claims for ASL that "agreement verbs have certain spatial restrictions that do not apply to spatial verbs".


⁹This view might, at first glance, appear compatible with Liddell (2000) and others who have argued that modifiable verbs in sign languages *indicate* their arguments rather than agree with them. However, I crucially make a distinction between spatial verbs and other verb types, as the corpus data patterns provide evidence that agreeing, neutral, and body-anchored verbs are subject to grammatical constraints that spatial verbs do not appear to be sensitive to. See Section 8.2 for discussion.

domly or (partially) based on geographical knowledge, but they might also reflect a position relative to the signer's body (close by or far away), or represent a location previously assigned to a discourse referent (i.e. an R-locus).

Two questions need to be addressed: (i) what does demonstration mean in linguistic terms? and (ii) how do signers choose which aspects of meaning to demonstrate?

I adopt Davidson's (2015, p. 513) definition of demonstration as a context-dependent event modification, where "demonstrations are performed so as to convey whatever aspects of an event are relevant within a given context of speech".

Davidson (2015) argues that demonstration is involved in quotation in spoken language, but also in (quotative as well as action) role shift and classifier predicates in sign languages. As illustrated by the compositional semantics in (5), both quotations (5a) (Davidson, 2015, p. 487) and classifier predicates (5b) (Davidson, 2015, p. 495) take a demonstration argument, which is calculated through a pragmatic, iconicity-based, component (see below). Classifiers additionally take an event argument (*moving*) and one or two thematic arguments, depending on classifier type. Since (5b) involves a whole-entity classifier, just a single argument is involved. As Davidson (2015) points out, this account preserves the iconic properties of classifier predicates, yet they are made formalizable within the framework of event semantics.

- (5) a. John was like "I'm happy."
 $\exists e. [agent(e, John) \wedge demonstration(d_1, e)]$
- b. BOOK CL():MOVE-DOWN ("The book fell down.")
 $\exists e. [theme(e, book) \wedge flatobject(book) \wedge moving(e) \wedge demonstration(d_1, e)]$

Davidson's (2015) account seems readily applicable to spatial verbs in DGS. Indeed, as I pointed out in the previous section, the verb forms BRING, SEND1, and THROW, which involve classifier handshapes, look very much like classifiers already. But the analysis applies equally well to GO1, GO2, and LEAVE: just like classifiers in Davidson's account, these verb forms can demonstrate properties of the movement of a referent. Aspects of movement that may be conveyed iconically include the type of trajectory (e.g. a straight line or an arc movement) and the beginning and end points of the movement. As I discussed extensively in the previous section, there are multiple options available regarding the type of locations utilized.

How can a signer choose among the various options that are available? Here, I again follow Davidson (2015) by proposing that the event aspects that are selected for demonstration are determined pragmatically. More specifically, signers are predicted to respect the Gricean Maxim of Quantity (Grice, 1975), which states that a speaker should be as informative as possible, while providing no more information than strictly necessary. For instance, if it is only relevant to convey that a referent went to a particular place, such as a cafe, but not so much (i) what location the referent came from, or (ii) what the absolute location of the cafe is, then the spatial verb will probably be articulated with a path movement from a place close to the signer to a place further away from the signer. If the initial location is relevant, then the verb is more likely to start out from a locus in the signing space which has been associated with a location. And since referent loci, once they have been set up, become part of the division of the signing space within the context of that discourse, a spatial verb might as well align with them whenever that is informative.

I would argue against analyzing instances like the latter as expressions of agreement: under the assumption, following Schlenker (2018a), that referent loci are a fusion of both a spatial location and a more abstract grammatical element (I argue in Section 8.2.1.3 that it is a feature), it may be argued that these R-loci simply represent locations in the eyes of a spatial verb. Indeed, classifier predicates can also align their initial and final places of articulation with referent loci, e.g. in order to express that a human entity walks from one referent to another, but this phenomenon would generally not be analyzed as agreement marking. I do not see why that should be different for spatial verbs.

If the movement of spatial verbs is indeed a demonstration, then it should also be possible for this movement to be adapted to the situation. Indeed, the token of the verb *BRING* depicted earlier in Figure 8.1 involves a movement that goes from a location on the signer's right to a location on her left via a location close to her body, as if to demonstrate that the bringing event occurs in two steps. Several similar instances of the three spatial verbs with classifier handshapes are attested in the corpus data; further experimental work is needed to verify that the spatial verbs *GO1*, *GO2* and *LEAVE* may also alter the trajectory of their path movement for demonstration purposes.

The view that spatial verbs are demonstration verbs is compatible with the observation that the restrictions on subject drop are seemingly less strict with spatial verbs than with other verb types. It has previously been suggested in the

literature that classifier morphology can license argument drop (see Glück & Pfau, 1998, for DGS and Kimmelman, 2018c, for RSL). Building on Davidson (2015), Kimmelman (2018c) proposes specifically that grammatical restrictions that usually apply with respect to the identification of referents are relaxed with classifier predicates, because the signer enters demonstration mode. As a result, referents become recoverable even when the usual licensing conditions do not apply.¹⁰

I suggest a similar analysis is applicable to spatial verbs in DGS. Recall from Section 7.6 that the verbs GO1, GO2, and LEAVE occur with null subject less often than the verbs THROW, BRING, and SEND1. I propose that for the former three verbs, which do not have classifier handshapes, there is less iconic information to rely on to identify a referent, thus making null subjects less common. Still, the demonstration of a spatial movement nonetheless offers some clues to facilitate agent identification, such that subjects may be dropped even when the verb does not align with the subject locus.

Since the verbs THROW, BRING, and SEND1 involve an additional demonstration component in the form of a classifier handshape – they do not only demonstrate spatial movement, but also the handling of an object (BRING; THROW) or a hand movement (SEND1) – there are more clues available to identify the subject when it is not overtly expressed in the sentence. As such, null subjects are more common with this subtype of spatial verb.

To conclude, I have argued that spatial verbs should be treated as a distinct verb category (contra de Quadros & Quer, 2008), even though they have some overlapping properties with agreeing verbs. I proposed that spatial verbs demonstrate spatial movement between locations or referents. This does not constitute a conventionalized grammatical system because there is considerable freedom with regard to which locations in the signing space the spatial verb marks through alignment – and what these locations represent – and there also do not appear to be any clear constraints on subject drop (see Padden, 1990, for a similar perspective on spatial verbs in ASL). Following Davidson (2015), I argued that spatial verbs begin and end their trajectory at locations which are determined pragmati-

¹⁰I should note that both Glück and Pfau (1998) and Kimmelman (2018c) make the claim about relaxation of the identification rules specifically for the object rather than the subject. However, I do not see why the same would not apply to subject identification. The use of a handling handshape, after all, implies the involvement of an agentive referent in the event (although that does not necessarily mean that this referent is present as an argument in the argument structure; see Kimmelman, de Lint, et al., 2019). The demonstration aspect may then allow for the recovery of this agent even if there is no agreement marking.

cally, by respecting the Maxim of Quantity. That is, signers will only provide information about locations or referents that is relevant to the discourse. Otherwise, they will opt for less specified places of articulation, e.g. locations in the signing space that have not been overtly associated with real-world locations or referents.

In principle, the analysis above should be applicable to all verbs that show flexible behavior in their specifications for movement and location. For verbs that qualify as such, it is then also predicted that they put looser restrictions on subject drop, as well as potentially other grammatical constraints that would normally be expected to apply. Further research would be welcome in this domain.

8.2 A unified account in terms of agreement

Although spatial verbs and agreeing verbs may look somewhat similar on the surface, the discussions in previous chapters have provided evidence that agreeing verbs have actually more in common with body-anchored and neutral verbs than with spatial verbs.

In this section, I argue that body-anchored, neutral, and agreeing verbs grammatically agree with their arguments, and I present a unified formal analysis accounting for these verbs, and the constructions they appear in, in these terms. More specifically, I propose that:

- (i) Agreeing verbs are in an agreement relation with their subject and direct object in transitive constructions, and with their subject and indirect object in ditransitive constructions;
- (ii) Neutral verbs are in an agreement relation with their subject and direct object in transitive constructions, and with the only present argument in intransitive constructions;
- (iii) Body-anchored verbs are in an agreement relation with only their subject – even in transitive constructions – due to the prominence of the signer’s body.

Agreement is not always overtly expressed, however. I claim that this is due to the – often iconically motivated – formational properties of the different verb types, such that:

- (i) Agreeing verbs are free to express agreement with two arguments, and they consistently do so;

- (ii) Neutral verbs only express agreement with a single argument, which is the internal argument in transitive or unaccusative constructions, and the external argument in unergative constructions;
- (iii) Body-anchored verbs are inherently first-person forms due to their body-anchored place of articulation, leading to a default first-person interpretation in case of a null subject.

In the next sections, I develop my formal account step-by-step. I start with body-anchored verb constructions (Section 8.2.1), as the iconicity effect that I have argued is triggered by body-anchoring motivates the introduction of a certain formal apparatus. The analyses for agreeing verbs (Section 8.2.2) and neutral verbs (Section 8.2.3) build on this account. Section 8.2.4 summarizes the main points.

8.2.1 An agreement analysis of body-anchored verbs

In the analysis of body-anchored verb constructions, the main observation I attempt to account for is that iconically-motivated body-anchored verbs appear to trigger a first-person interpretation in the absence of an overt argument.¹¹ In the next section, I first discuss some alternative approaches that could potentially explain the attested patterns, and I show why those do not satisfyingly capture the data. I then present my arguments for pursuing an account in terms of verb agreement, devoting the remainder of this section to developing this account in further detail.

8.2.1.1 Toward an agreement analysis

Some spoken languages, such as Finnish and Marathi, are sometimes classified as partial null-subject languages. In such languages, pro-drop is usually restricted to first- and second-person subjects (Holmberg, 2005; Holmberg, Nayudu, & Sheehan, 2009). Holmberg (2005) argues that the differences between consistent and partial pro-drop languages derive from the feature specification of the T-head: only in the former does T have a D-feature specification, and can it license a deficient third-person null subject. In partial pro-drop languages, T cannot license

¹¹This section is an adaptation of part of a previously published article with Vadim Kimmelman (Oomen & Kimmelman, 2019), on subject-drop patterns in DGS and RSL. For consistency, I continue to use the pronoun 'I' rather than 'we'.

deficient null subjects, so third-person null subjects are prohibited. First- and second-person null subjects, in contrast, are fully specified DPs that are deleted at PF, so they are allowed.

At first glance, it might appear as if DGS behaves in a similar way to partial null-subject languages, given that they, too, disallow third-person subject drop. However, a crucial difference is that the restriction on third-person drop in DGS only applies to a specific type of verbs. An analysis à la Holmberg (2005) fails to account for this division, as it would be far-fetched to claim that DGS has two different types of the T-head which happen to combine with different verb types. It seems more plausible that the null-subject pattern in DGS arises as a result of a structural difference related to verb type.¹² Moreover, person marking in sign languages differs from person marking in spoken languages (see Chapter 1.2.2), and I will argue that these differences also translate into different feature specifications (Section 8.2.1.3). In relation to this point, although additional data is needed for verification, I argue that the restriction on subject drop applies to non-first person subjects only. Conversely, first-person subjects can be dropped in constructions with body-anchored verbs in DGS. Indeed, the corpus data provide some support for this prediction (see Section 8.2.1.7 for further discussion). I conclude that DGS cannot be analyzed as a partial null subject language.

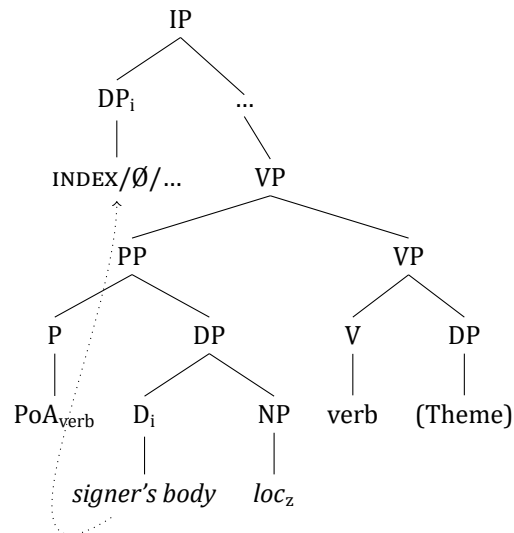
Lillo-Martin (1986, 1991) proposes for ASL that null arguments with plain verbs – which include body-anchored verbs – are variables which are licensed by being bound by an empty topic (see Chapter 1.2.5), while agreeing verbs have the additional option of licensing null arguments through agreement marking. However, if null subjects with body-anchored verbs are licensed by empty topics, then it is unclear why only first-person subjects would be allowed to be dropped. In a reaction to Lillo-Martin's work, Bahan et al. (2000) claim that eye gaze toward the locus of the relevant argument may license argument drop in constructions with plain verbs in ASL. I have not systematically investigated eye gaze patterns in the DGS data, so technically such an analysis might also apply to DGS. However, an account along these lines again fails to explain why first-person null subjects would behave differently from non-first person null subjects. In addition, Hosemann (2011), who analyzed eye-tracking data from three DGS signers, shows that all three signers typically gaze toward the addressee during the articulation of a

¹²Note that Lillo-Martin (1986, 1991) also claims on the basis of American Sign Language (ASL) data that different verb types trigger different subject-drop patterns. See below for my objection to her approach, based on the DGS data.

plain verb.

As discussed in Chapter 4.1.2, I found in Oomen (2017) that null third-person subjects with psych-verbs – a subset of body-anchored verbs – are dispreferred in NGT, thus essentially displaying the same pattern as null subjects with body-anchored verbs in DGS. Informally, I concluded in Oomen (2017) that body-anchoring triggers a default first-person interpretation in the absence of an overt subject. In formal terms, I modelled this as follows: the body of the signer is part of a locative adjunct adjoined to the VP, which represents the iconic components of body-anchored psych-verbs. The adjunct contributes the meaning “[psychological state] at location_z in the signer’s body”, and is projected when a body-anchored psych-verb is articulated. For instance, the verb LOVE – which is articulated on the chest as a reference to the heart as the metaphoric location of love – projects a locative adjunct that can be loosely paraphrased as ‘[love] in the signer’s body’s heart’. Note that ‘the signer’s body’ is an atomic, non-compositional, component.

(4) Syntactic structure of psych-verb constructions in NGT



The syntactic structure proposed in Oomen (2017) is reproduced with minor adaptations in (4). The locative adjunct is a prepositional phrase headed by the place of articulation (PoA) of the verb, which functions as a preposition. Note that this element is part of the manual articulation of the sign and hence is not rep-

resented by the body. The DP that is selected as the PP's complement is headed by a possessive determiner represented by the signer's body – the “container” of the psychological state. Finally, the location (loc_z) in or on the body which is singled out by the place of articulation of the psych-verb, e.g. the heart in the case of LOVE, functions as the complement of the DP. Together, the content of the PP thus roughly translates as ‘[psychological state] in the signer's body's heart/head/...’.

Crucially, the possessive determiner – the signer's body – is a variable that is specified for either one or two features. The first feature, *b*, simply indicates that the signer's body is the container of the psychological state, and it ensures that the verb is articulated on the signer's body even if the signer him- or herself is not the experiencer of the psychological state. The second feature is a first-person feature whose selection is dependent on the items present in the numeration. There are three options: the numeration (i) includes a lexical item specified for first person; (ii) includes a lexical item specified for (any) non-first person; or (iii) does not include a lexical item carrying a person feature. In scenarios (i) and (iii), the variable receives a first-person feature. In case option (ii) applies, the variable is specified for a *b* feature only.

The first-person feature leads to a first-person interpretation in constructions with a non-overt subject because of a co-indexing relation between the variable endowed with this feature and the subject higher up in the structure. In Oomen (2017), I point out that the analysis compels the experiencer argument to subject position. Indeed, there are no object experiencer psych-verb constructions in NGT (cf. Belletti and Rizzi, 1988, and many others).

Although the analysis discussed above is in principle applicable to DGS, I have several motivations for pursuing a different approach here. One issue with the account is that it relies on the idea that variable selection is dependent on other items in the numeration. While technically allowed, this mechanism is a somewhat artificial solution to the issue it intends to solve. In essence, it introduces circularity: the (un-)availability of person features in the numeration dictates how the variable is specified, which in turn determines whether or not a null subject is permitted in the clause. An account that would avoid this circularity would be preferred.

Furthermore, the analysis stipulates that body-anchored verbs project a locative adjunct that would be entirely absent in the structure of other verb types. This is not really an issue in Oomen (2017), as only psych-verb constructions are investigated, and thus no claims are made about other verb types. However, I showed

in previous chapters that body-anchored verbs in DGS share key properties with other verb types, such that it seems reasonable to analyze these verbs in more comparable terms.

Thus, I suggest that the point where verbs of different types compare is that they are in an agreement relation with their arguments – even body-anchored verbs, which are typically considered to be non-agreeing verbs. I have several motivations for taking such an approach.

Firstly, many researchers have remarked that the fact that agreement is limited to a particular subset of verbs with a shared semantics is a non-canonical property of the agreement system in sign languages. This peculiar state-of-affairs largely dematerializes when agreeing, body-anchored, and neutral verbs are all analyzed as expressing agreement.

Secondly, the key claim that body-anchoring triggers a first person interpretation of a null subject is compatible with approaches that assume that the ϕ -features of the null subject are identified by the functional phrase that bears the inflectional features of the verb. Crucially, I propose that body-anchored verbs are always ‘inflected’ in the same way, hence are always associated with the same ϕ -feature – which is a first-person feature. Consequently, the null subject in a construction with a body-anchored verb always gets a first-person interpretation. An obvious problem for such a perspective is that clauses with body-anchored verbs may contain subjects that are *not* first person, in which case there appears to be a mismatch between the (non-first-person) subject and the (first-person) body-anchored verb. The question, then, becomes how we can account for sentences with an overt third-person subject and a body-anchored verb. I address this matter in detail in Section 8.2.1.4.

A further advantage of an agreement approach is that it goes some way toward solving another puzzling aspect of sign language verb agreement: the apparent primacy of object over subject marking. As previously discussed in Chapter 4.1.1, Meir et al. (2007) attempt to solve this issue by proposing that the body represents the subject in body-anchored verbs. The body is then argued to take on a different role in agreeing verbs, where it encodes first person instead of subject. This means that the change from body-anchored into agreeing forms, as Meir et al. (2007) report for several verb forms in Israeli Sign Language and Pfau et al. (2018) describe for DGS, also involves a change in what the body encodes in such forms. The analysis I propose for DGS simplifies this proposal by Meir et al. (2007) by claiming that the body always encodes first person – irrespective of verb type.

I conclude that an agreement analysis of body-anchored verbs has appealing benefits and is thus worth pursuing. In the following sections, I look at the technical side of the analysis, starting with determining what kind of person features are involved in DGS.

8.2.1.2 Person vs. referent

For the sake of simplicity, I have talked about *person* being the relevant grammatical category expressing distinctions between referents up until now, assuming a three-way distinction between first-, second-, and third-person. Here, I propose a refinement of this system in order to account for the observation that in sign languages, non-first person referents become associated with a particular location in the signing space within the context of a discourse. As such, any reference that is subsequently made to such a location picks out a *specific* referent (which may also be plural), rather than the pool of all possible referents available within a particular discourse that a third-person pronoun would typically pick out in spoken languages.¹³ Conversely, the same referent can be associated with different R-loci in different conversations.¹⁴

Thus, I introduce the term *referent* in lieu of *person*, which I will use consistently from now on to refer to the grammatical category used to distinguish between the speaker and other participants in an event, including the addressee. Nonetheless, I will continue to use the term ‘person’ descriptively, as in e.g. ‘a first-person subject has a different referent feature value than a third-person subject’.

The proposal for a referent category is in consonance with analyses that argue for a first versus non-first ‘person’ distinction in sign languages (e.g. Engberg-Pedersen, 1993; Hou & Meier, 2018; Meier, 1990; Rathmann & Mathur, 2002). A referent ϕ -feature is also close in spirit to Costello’s *identity* feature, “an abstract feature that encodes identity but is not intrinsically related to location” (2015, p. 252), and it echoes Steinbach and Onea’s (2016) proposal for DGS that non-first person subjects are specified with an abstract feature associated with a particular location in the signing space for the duration of a discourse.

Indeed, I follow Steinbach and Onea (2016) in positing an abstract R/L-feature

¹³It may well be possible that there are spoken languages that have a system akin to the one described here for sign languages, although I do not know of any such languages. If they turn out to exist, then the analysis proposed in this section may equally apply to them.

¹⁴In fact, R-loci may even change within a discourse, as in the case of role shift, for example.

for non-speaker referents with a semantics of reference tracking. Steinbach and Onea (2016) observe that in most cases where two referents are localized in DGS, one referent becomes associated with the right side of the signing space, and the other with the left side. Whenever more referents are introduced in the discourse, these regions are further subdivided when necessary. For the authors, feature values are thus recursive: you can have an R-value, an L-value, a RL-value (left part of the right side) and a RR-value (right part of the right side), etc. In this system, a newly introduced referent in the discourse will always become associated with a region that is maximally contrastive to the previously introduced region.

Steinbach and Onea (2016) state that pronominal points toward the addressee are typically realized in the central area of the horizontal plane, and thus do not participate in a system of maximal contrast. However, on the presumption that second-person referents can, in principle, be localized at all the same locations as third-person referents, I propose that second-person referents come with an R/L-feature, too. I come back to the treatment of second-person referents within the context of the syntactic analysis of body-anchored verb constructions in Section 8.2.1.7; for now, it suffices to say that I assume no formal distinction between second and third person.

Steinbach and Onea (2016) do not discuss first-person referents, but their approach seems compatible with proposing that first-person pointing signs have a value of the same abstract feature, which I will refer to as a 'speaker' value.

A final important aspect of Steinbach and Onea's (2016) account I wish to mention here is that noun phrases are also specified with an R/L-feature value. This holds even when there is no overt marker of localization in the clause, as sometimes a noun phrase is not localized overtly but is later still referred back to with a pointing sign toward a particular locus.

In the next section, I discuss my theoretical assumptions regarding the interaction between syntactic and semantic referent features before putting forward the complete inventory of referent-feature values needed to model agreement in body-anchored verb constructions in DGS.

8.2.1.3 Inherent and interpretable features

As precluded earlier, I argue that body-anchored verbs have 'speaker' feature values leading to a first-person interpretation of a null subject. However, that also means that a mismatch in features arises between the subject and the verb when

the (overt) subject referent is non-first person. The key to solving this mismatch problem lies in making the distinction between formal (i.e. syntactic) and semantic specifications of features, where the former are lexically specified grammatical features, while the latter make a semantic contribution to interpretation. I follow Pesetsky and Torrego (2007) in assuming that formal and semantic features are distinct, independent, concepts. Adopting terminology proposed by Matushansky (2013), I assume that formal features can be either inherent or non-inherent, and that semantic features can be either interpretable or uninterpretable.

The uncoupling of these two dimensions presupposes that there are four types of features: (i) uninterpretable, inherent; (ii) uninterpretable, non-inherent; (iii) interpretable, inherent; and (iv) interpretable, non-inherent. This typology diverges from Chomsky's assumption that "uninterpretable features, and only these, enter the derivation without values" (2001, p. 5). However, Pesetsky and Torrego (2007) show that this condition is insufficient to account for various syntactic phenomena, such as the relation between the category T and the finite verb, as well as the relation between C and *wh*-phrases. Other researchers have since successfully adopted their approach to account for other phenomena, including gender mismatch (see e.g. Ackema & Neeleman, 2013; Matushansky, 2013; Sauerland, 2004; Steriopolo & Wiltschko, 2010), which I will show in Section 8.2.1.4 to bear compelling parallels to referent mismatch in DGS.

We may now determine which feature values are specified on subjects and verbs in DGS.¹⁵ An overview of the feature specifications of subjects and body-anchored verbs I propose is presented in Table 8.1.

Table 8.1: Feature values specified on subjects (first, non-first, and null) and body-anchored verbs.

	First	Non-first	Null	Verb
Formal	[NREF:Sp]	[NREF:R], [NREF:L] ...	[NREF]	[IREF:Sp]
Semantic	[[SPEAKER]]	[[R]], [[L]] ...	-	- <i>or</i> [[SPEAKER]]

Starting with formal features, in spoken languages, pronouns and NPs can be said to possess inherent ϕ -features, while the verbs that agree with them are associated with non-inherent features. Based on the properties of the referential

¹⁵Technically, of course, these features reside in DPs and specifiers of functional projections, but I am abstracting away from the precise structural details here; these are postponed until Section 8.2.1.5.

system in sign languages, I argue for the opposite scenario in clauses with body-anchored verbs – as well as other verb types – in DGS. That is, I propose that nominal and pronominal subjects have *non-inherent* referent feature values as a result of the spatial nature of the pronominal system in sign languages, where referents are not associated with fixed loci.

Thus, a non-first person pronoun is specified with a non-inherent R/L-feature value, which can be [NREF:R] (i.e. locus on the signer's right), [NREF:L], and so on, dependent on which values have been assigned to other referents earlier in the discourse. A first person pronoun also receives a non-inherent R/L-feature value on the assumption that the first-person pronoun INDEX₁ is part of the same paradigm as non-first person pronouns. I refer to a first-person referent's non-inherent feature as [NREF:Sp], where 'Sp' stands for speaker.

As such, all pronouns have referent features in our system – in contrast to what is commonly accepted for the comparable person features in spoken languages, where third person is usually characterized by the absence of person features (Harley & Ritter, 2002). I would argue that this is an acceptable solution, since (a) I have proposed that the grammatical category 'referent' has slightly different properties from the grammatical category 'person', and (b) pronouns in sign languages have semantic information associated with them (they track referents using a spatial mechanism). As such, they cannot simply be analyzed as bearing no referent features.

Nominal arguments are endowed with the same features as pronominals, following Steinbach and Onea's (2016) assertion that noun phrases are also associated with an R-locus, whether that is overtly visible or not.

For all these features, I propose that they come into the derivation already valued, in line with Matushansky (2013). However, non-inherent features still need to be licensed, which may happen either through feature matching or semantic interpretation (see Section 8.2.1.4).

Finally, null arguments do not have a formal feature specification (indicated in Table 8.1 as [NREF]) because they do not have any phonological content. Null arguments can thus be said to be to have a defective referent feature, which then needs to be bound by a verbal functional head (in line with Kratzer, 2009); see Section 8.2.1.6 for an explanation of the mechanics.

In contrast to (pro)nominal arguments, body-anchored verbs have an *inherent* referent-feature specification [IREF:Sp]. The value is inherent because body-anchored verbs are fixed forms that reference the speaker by virtue of their ar-

ticulation on the body. Thus, whereas Pesetsky and Torrego (2007, 264, fn. 2) remark that they are “...unaware of verbs that have, for example, only first-person forms...”, I claim that the equivalent of that exists in languages in the signed modality.

With respect to semantic features, first-person subjects bear an interpretable *[[SPEAKER]]* feature value, while non-first person subjects bear an interpretable value *[[R]]*, *[[L]]*, etc. This means that the R/L values are basically interpreted as individual indexes associated with individual referents and are used for reference tracking. Crucially, body-anchored verbs come with a *[[SPEAKER]]* feature value only when that is required for a proper interpretation of the clause – namely, when it contains a non-overt subject. I explain this mechanism in more detail in the next section.

8.2.1.4 Feature (mis)match

A consequence of introducing an inherent speaker-feature value on the body-anchored verb, as proposed in the previous section, is that a feature clash arises in the case of a non-first person subject. This situation has parallels with gender mismatch in spoken languages, a phenomenon that has attracted the attention of linguists for some time, going back to at least the seventies (see Corbett, 1979). Works accounting for gender mismatch in spoken languages may thus serve as inspiration for solving the feature clash in DGS.

Gender can be both semantically and formally assigned to nouns, and languages differ with respect to how they assign it. Some languages have a fully semantic system, while others have a predominantly formal system. Because gender generally has a grounding in semantics, languages that allow syntactic gender often present mixed gender systems. In such mixed languages, the semantic gender of the referent denoted by the noun may differ from its formal gender, which may in turn give rise to mixed agreement, i.e. different marking on the noun *vis-à-vis* its modifiers and/or the verb. The restrictions on the possible combinations of semantic and formal gender marking are language-specific.

Various theoretical analyses have been put forward to account for mixed agreement patterns (e.g., Ackema & Neeleman, 2013; Sauerland, 2004; Steriopolo & Wiltschko, 2010), and each has its own advantages and challenges. The analysis I choose to focus on here is Matushansky’s (2013) account of gender mismatch in

spoken Russian.¹⁶

Matushansky (2013) studies mixed agreement in Russian and provides a theoretical analysis that is equipped to account for examples such as (5) (Matushansky, 2013, p. 283). In (5), there is mixed agreement between the noun with modifiers and the predicate. *Vrač* ('doctor') is a noun with formal masculine gender, and the determiner and adjective modifying the noun also take masculine gender in this example. However, the predicate is marked for feminine gender.

- (5) Naš rajonnyj vrač byl-a bol'n-a [Russian]
 our.M district.M doctor.M was-F sick-F
 'Our district doctor was sick.'

Matushansky (2013) proposes that agreement markers on verbs with non-inherent feature specifications, like the copula *byl-a* in (5), can be endowed with semantic features as a last-resort strategy to yield the correct semantic interpretation. In her system, instances of features that are non-inherent come into the derivation already valued, but still need to be licensed (i.e. Agree), which may happen in one of two ways: either a non-inherent instance of a feature is matched with an inherent instance residing in a sister node, or it gets semantically interpreted due to the presence of an interpretable feature, which, as described above, may be introduced as a last resort.¹⁷ Under the assumption that interpretable features override inherent grammatical features, this operation results in the (semantically) correct interpretation of the gender of the relevant referent.

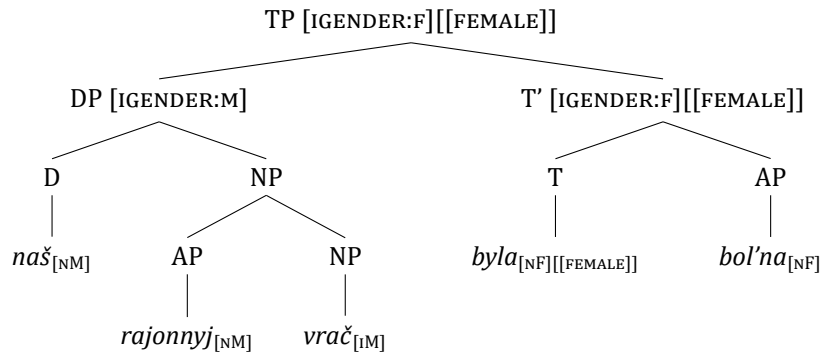
The syntactic structure Matushansky (2013) proposes is represented in (6). In order to resolve the clash that arises between formal feature specifications [IM] on the noun and [NF] on the predicate, an interpretable feature [[FEMALE]] is in-

¹⁶Nonetheless, the constructions in DGS that I wish to account for may just as well be formalized according to the principles proposed in any of the alternative analyses. However, I am not concerned with assessing the benefits and drawbacks of the various frameworks, or with evaluating which analysis best fits with our observations. I am merely interested in the theoretical deliberations that are at the core of all of these proposals, and I borrow the formal mechanics of one of them to visualize how the feature mismatch problem we are presented with in DGS could be resolved.

¹⁷As such, Matushansky (2013) diverges from Pesetsky and Torrego's (2007) definition of Agree, who consider it to be exclusively a feature-sharing mechanism where two occurrences of a feature enter into agreement. These occurrences may both be unvalued (more or less the equivalent of non-inherent in Matushansky's system), that is, being unvalued is not a precondition for being uninterpretable. This latter, crucial, notion is preserved in Matushansky (2013).

serted as a last resort on the predicative copula. Since interpretable features override inherent features, the correct (female) interpretation is derived.

(6) ‘Our district doctor was sick.’



My account of DGS builds on the same principles outlined by Matushansky (2013). I propose that in DGS, referent features can be assigned both semantically and formally to subjects as well as to verbs. I motivate these different feature specifications as follows: body-anchored verbs and subjects have formal referent-feature values because these specify a location, which can be either the body of the signer or some locus in the signing space. This means that a mismatch arises whenever a body-anchored verb – specified formally for speaker referent – is combined with a third-person subject with a corresponding formal (albeit non-inherent) R/L-specification. Remember that body-anchored verbs have an inherent referent-feature specification because their form is fixed and does not change depending on the subject referent. The subject bears a semantic feature because it provides semantic information, namely reference tracking.

Crucially, in the case of a null subject, which does not come equipped with a semantic feature, the body-anchored verb will be specified with a semantic speaker feature as a last-resort strategy to ensure interpretation of the null subject referent. This is quite unlike any mechanism Matushansky describes, but I argue it is necessary and reasonable to introduce such a feature because it is a representation of the iconicity effect that I have argued occurs: signers can access a default speaker interpretation of a null subject in clauses with iconically motivated body-anchored verbs. That is, body-anchoring restricts the semantic interpretation of the subject referent to ‘speaker’ only. In clauses with an overt subject, there is no need for such a last-resort semantic feature to be introduced, since the subject itself will already provide the semantic information necessary for the construction

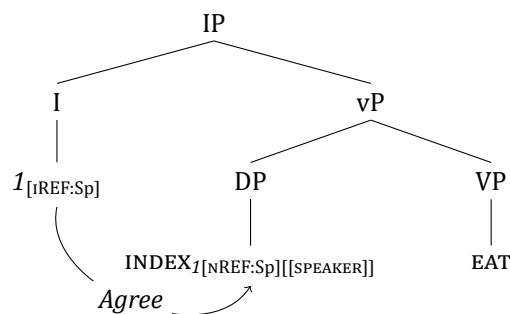
to be interpretable. In the next section, I show how the scenario described here works out structurally.

8.2.1.5 Structural representations of body-anchored verb constructions

Translating the above into structural representations, I propose the schematic structures in (7) to (9) below. Before I discuss these structures in detail, let me articulate some assumptions I make regarding the derivation. Following standard practice, subjects are merged into the structure in the specifier of the vP while direct objects are situated in the complement of V. Depending on verb type, agreement features are borne by the I- and/or v-head. In the case of a body-anchored verb, only the I-head carries referent features (see below).

Note that, in the present and following sections, I am not concerned with deriving the correct surface constituent order(s) in body-anchored verb constructions; Section 8.3.1 addresses this matter separately. Here, my intention is to spell out the intricacies of the agreement mechanism I propose, in particular the interaction between referent features associated with the body-anchored verb and the (overt or null) subject.

(7) 'I ate.'

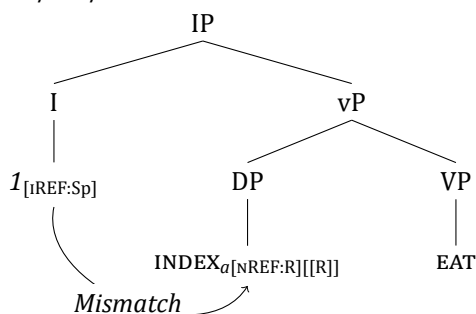


The syntactic structure of a clause with an overt first-person subject and an intransitively used body-anchored verb is represented in (7). An inherent speaker feature [IREF:Sp] associated with the body-anchored verb resides in the I-head. In the structure, 'I' in the I-head indicates marking of the first-person locus, i.e. the signer, through body-anchoring. The pronominal subject INDEX₁ is located in the specifier of the vP and bears a non-inherent speaker-feature [NREF:Sp] as well as

an interpretable $[[\text{SPEAKER}]]$ -feature. There is no mismatch situation; the referent features in I and the specifier of the vP match, and we get a first-person interpretation of the subject. The verb EAT in V subsequently moves via v to I (not depicted in the representation) to pick up the speaker-referent features, which is phonologically realized as body-anchoring. At this point, additional operations need to occur to derive the correct surface order(s), in particular regarding the position of the object vis-à-vis the verb; see Section 8.3.1 for further discussion.

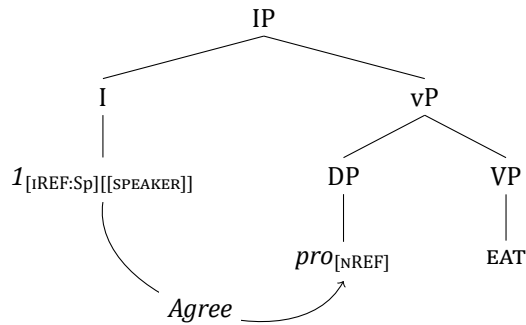
The structure for clauses with a non-first person referent and a body-anchored verb – the mismatch scenario – is illustrated in (8). The structure is identical to the one with a first-person subject in (7), with the exception of the features that are specified on the subject. While there is a mismatch between the formal features on the subject (NREF:R) and I (IREF:Sp), this is overridden, à la Matushansky, by the interpretable feature on the subject. In other words, interpreted agreement overrides the inherent speaker feature in I. Nominal subjects are endowed with the same features as (third-person) pronominals; the structure will thus be the same.

(8) 'He/she/it ate.'



Finally, (9) represents the structure of clauses with a null subject. Since the non-inherent feature of *pro* does not have a value, an interpretable feature needs to be introduced on the verb as a last resort. Due to the verb's body-anchored form, the specification of this feature is necessarily $[[\text{SPEAKER}]]$. The non-inherent feature on *pro* gets valued through checking, resulting in a first-person interpretation of the null subject.

(9) '[I] ate.'



The account I have proposed above rests on the assumption that body-anchored verbs are first-person forms. An interesting question worth entertaining is whether this holds for all body-anchored verbs, or only for those that are iconically motivated. While we can only speculate at this point, given that almost all body-anchored verb forms in the DGS data set have a clearly iconic place of articulation, I would hypothesize that only an iconically motivated body-anchored verb activates an association with the speaker.¹⁸ Further testing is needed.

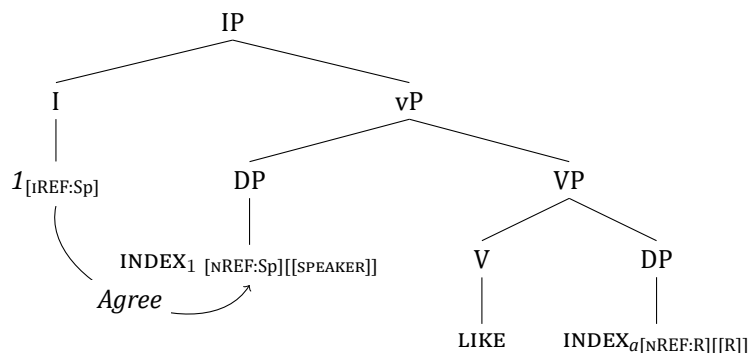
8.2.1.6 Transitive constructions with body-anchored verbs

In (10), I present the syntactic structure for transitive constructions with body-anchored verbs. The first-person pronominal subject and the direct object $INDEX_a$ both have non-inherent and interpretable referent features.¹⁹ As in intransitive constructions, there is an inherent speaker-feature in I, which agrees with the features in the DP situated in the vP-specifier. In (10), there is no mismatch situation, and we simply derive a first-person interpretation of the subject. When there is a mismatch situation, the interpretable referent feature in the subject DP overrides the inherent feature in I to yield a non-first person interpretation.

¹⁸The RSL data analyzed in Oomen and Kimmelman (2019) present some support for this idea: four RSL examples with a body-anchored verb and a null third-person subject – exceptions to the hypothesis that only first-person subjects can be null – involve the verb LIVE. Indeed, this verb is body-anchored but, as far as we can tell, not iconically motivated.

¹⁹The object's non-inherent feature gets licensed by its interpretable feature, which is one of the two strategies to license non-inherent features according to Matushansky (2013).

(10) 'I like him.'



Thus, transitive body-anchored verbs agree in referent features with their subject but not with their object – indeed, there is no marking to suggest that such object agreement is instantiated (but see Section 8.2.2.2 on hybrid forms, as well as Section 8.3.2 on the agreement auxiliary PAM). This raises questions about how null objects, if they occur, would be licensed if not through agreement. As I have not studied object drop with body-anchored verbs in detail, partially because there are just two body-anchored forms (LIKE and DISLIKE) in the data set that are obligatorily transitive, this question needs to be left for future investigation. In Section 8.3.3, I briefly entertain some of the possible analyses to guide such potential follow-up research.

8.2.1.7 Second person

The analysis laid out in the sections above is predicated on the assumption that second-person referents are associated with the same referent-features as third-person referents. As such, a second-person interpretation should not be available for null subjects with body-anchored verbs. However, I did find some examples of second-person subject drop in the corpus data, as in (11), reproduced from (30) in Chapter 4.3.3.

- (11) $\overline{\text{KNOW2}} \text{ COFFEE FILTER}^{\text{re}}$
 'You know, a coffee filter.' [hh01-A-05:09.90]

As discussed in Chapter 4.3.3, most of these counterexamples have in common that they are questions to the addressee.²⁰ Crucially, such questions are mark-

²⁰Two counterexamples are not questions, but these both have other non-canonical

ed by (a combination of) non-manuals such as body leans, eyebrow raise, or eye gaze toward the addressee. Indeed, in a typological study of interrogative constructions in 35 sign languages, Zeshan (2004b) reports that all sign languages in her sample – which includes DGS – employ non-manual marking for questions. In addition, she notes that there are few differences across sign languages with respect to the status and scope of non-manual markers in interrogative constructions, in contrast to other domains where non-manual marking often occurs, such as negative constructions. For DGS, Bross (2018) independently reports, on the basis of elicited data, that eyebrow raising is an obligatory non-manual interrogative marker. Thus, there is evidence that questions in DGS are consistently non-manually marked. I therefore hypothesize that this non-manual marking is able to introduce the feature that determines the reference of the subject.

A concrete formal implementation of this hypothesis is left for future research. Still, irrespective of the technical details, such an account requires a syntactic (rather than prosodic) analysis of non-manual markers for questions (see Dachkovsky & Sandler, 2009; Sandler, 2011; Sandler & Lillo-Martin, 2006; Wilbur & Patschke, 1999 for a discussion of the syntax vs. prosody debate).

8.2.1.8 Role shift

Finally, in this section, I sketch an analysis of body-anchored verb constructions involving action role shift to account for the fact that the presence of role shift markers lifts the constraint on non-first person subject drop: in role-shifted constructions with body-anchored verbs, subjects of all persons may be null. There are various approaches to role shift (Lillo-Martin, 1995; Quer, 2011; Schlenker, 2017), but the analysis is in principle compatible with any approach as long as role shift is considered a manifestation of or related to context shift.

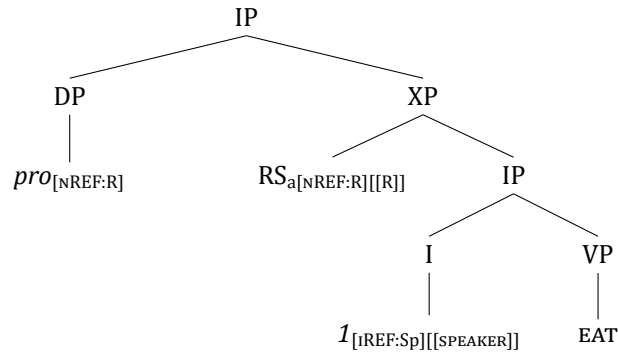
The basic logic is as follows: role shift introduces an operator expressing context shift, under which constituents marked with role shift are not interpreted relative to the context of the utterance, i.e. the global context, but relative to the shifted context, i.e. the local context. Since body-anchored verbs have a speaker-referent feature in my approach, there is an effect of context shift on interpretation. Specifically, when marked with role shift, the body-anchored verb still possesses the [iREF:Sp] and [[SPEAKER]] features so that the referent of the subject

properties which lead me to conclude that they do not form real counterexamples; see Chapter 4.3.3 for discussion.

has to be first person (the speaker) – but only within the shifted context. The (null or overt) subject is outside the scope of role shift and thus context shift.

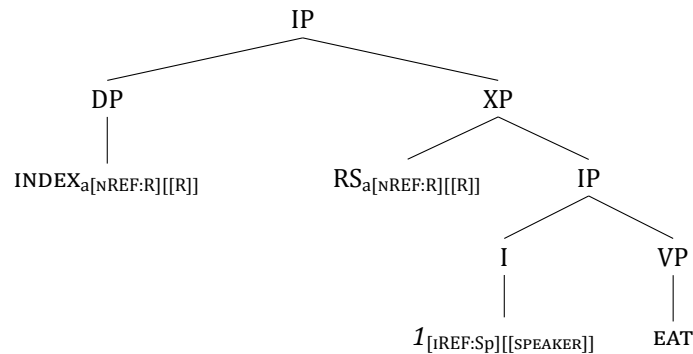
A syntactic analysis for the null-subject case is presented in (12). Within the scope of the role shift, we have a body-anchored verb forcing a first-person interpretation, as in (9) above. The role shift is an operator producing context shift, such that the reference to the speaker in the shifted context corresponds to another referent in the global context (see below for the semantics). Also, in this approach, the role-shift operator itself introduces the referent (R/L) values of the subject, which the null subject lacks.

(12) ‘[He/she/it] was eating (like this).’



In case of an overt subject outside the scope of role shift, I propose a very similar structure (13) with the exception that the global subject also bears the R/L-referent values. The features on the subject and the role shift operator match, thus resulting in a third-person interpretation.

(13) ‘He/she/it was eating (like this).’



A simplified semantics of the role-shift operator is represented in (14), after Schlenker (2017, p. 41). What the formula means is that the $[[\text{SPEAKER}]]$ -value under role shift will be interpreted with respect to the modified context $\langle s(i), w \rangle$, so the reference of the speaker is now determined by the i index on the role-shift operator.

- (14) If c is a context, s an assignment function and w a world parameter,

$$[[\text{RS}_i \text{ VP}]]^{c,s,w} = [[\text{VP}]]^{\langle s(i), w \rangle, s, w}.$$

Thus, I can easily account for the observation that null subjects of body-anchored verbs can be interpreted as third person in clauses with role shift: the solution is that they are actually interpreted as first person – but only within the shifted context.

8.2.1.9 Interim conclusions

In this section, I argued that body-anchored verbs are in an agreement relation with their subject by sharing referent features with it. The key argument in favor of such an approach is that null subjects in body-anchored verb constructions are, almost without exception, first person, whereas other verb types allow the drop of subjects of all persons (see Section 7.6). I attributed this asymmetry to iconicity: body-anchored verbs use the body of the signer as a place of articulation, and the signer's body is interpreted by default as referring to the signer, that is, as a first-person expression. Other verb types do not contain the body as a meaningful part of the sign, and thus no such constraints on reference of a null subject apply.

I developed a formal account in which I drew a comparison to mixed gender agreement as attested in spoken languages such as Russian. Specifically, I argued that body-anchored verbs bear an inherent speaker-referent feature, and, in the absence of an overt subject, this leads to a first-person interpretation through the introduction of an interpretable feature in I as a last-resort strategy. Loosely put, one could say that the body-anchoring of the verb becomes interpretable. When a third-person overt subject is combined with a body-anchored verb, a feature mismatch occurs. I posited that this clash does not lead to a derivation crash because of an interpretable feature on the subject which overrides formal features.

This proposal has parallels with Meir et al.'s (2007), who remark that body-anchoring appears to make the referent associated with the body – usually an experiencer – highly prominent. They therefore propose that the body represents

the subject. A similar intuition underlies my analysis, although I formalize it somewhat differently by proposing that body-anchoring is associated with an inherent speaker-referent feature in the I-head.²¹ That is, the body does not represent the subject, but it is responsible for the introduction of a speaker feature which enters into an agreement relationship with the DP in the specifier of the vP, i.e. the syntactic position of the subject.

The analysis I proposed predicts that the restriction on subject drop in body-anchored verbs should equally apply to second-person subjects. The corpus data provide support for this prediction when only declarative sentences are considered; in interrogative constructions, however, second-person subject drop seems to be allowed. I tentatively suggested that non-manual question marking, in particular eye gaze, syntactically licenses second-person subject drop in these cases, although more research is required. Finally, I demonstrated that the analysis also readily accounts for the observation that the constraint on interpretation of null subjects is lifted in the presence of role shift.

In the analysis put forward in this section, I clearly distinguish modality-independent linguistic principles and modality effects. The formal analysis that I developed uses modality-independent mechanisms of feature matching and mixed agreement. At the same time, the features themselves are modality-specific, as the reference-tracking system in sign languages is fundamentally different from the person system that spoken languages are typically said to use (Steinbach & Onea, 2016). A modality effect – or rather, an iconicity effect – in the analysis is that body-anchored verbs bear an *inherent* speaker-referent feature, which is motivated by the fact that body-anchored verbs have a fixed iconically-motivated place of articulation on the body. Crucially, while I do not appeal to iconicity in the grammatical analysis itself, it serves as a background for motivating specific grammatical properties of verbal signs.

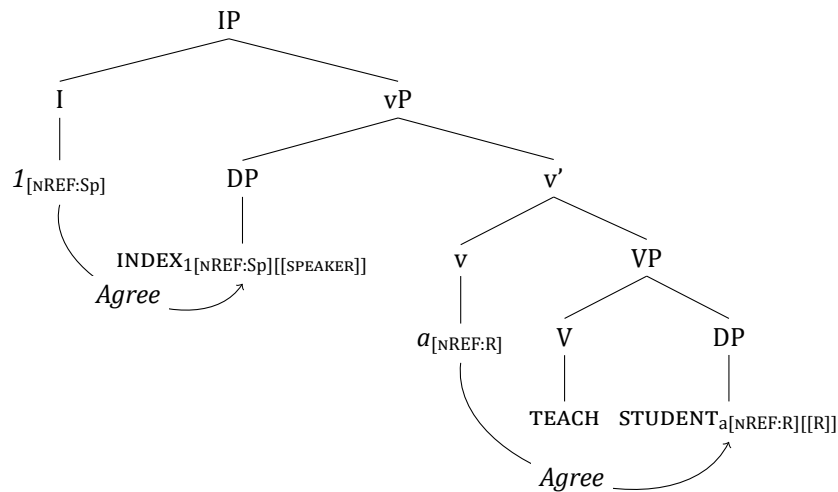
In the next sections, I account for sentences with agreeing verbs (Section 8.2.2) and neutral verbs (Section 8.2.3) by making use of the same general mechanics as for body-anchored verb constructions, resulting in a unified account of constructions with verbs of all three types.

²¹I should note that Meir et al. (2007) are not specific about how their 'body as subject' generalization would be formalized; it may be possible that their ideas are actually compatible with mine.

8.2.2 Accounting for agreeing verbs

The account for regular agreeing verbs preserves the main elements from the analysis of body-anchored verb constructions, but should additionally reflect that agreeing verbs (i) agree with two arguments, and (ii) unlike body-anchored verbs, do not have a fixed place of articulation. The structure for clauses with an agreeing verb and two arguments is represented in (15).

(15) 'I'm teaching a student.'

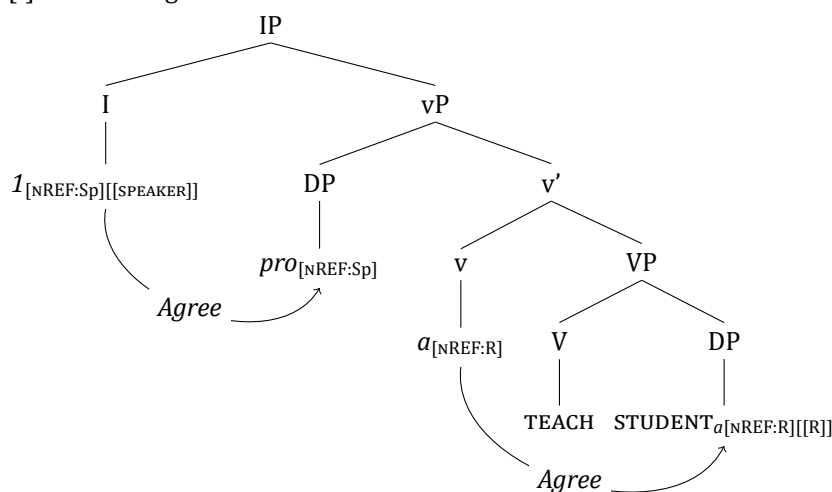


The two arguments, hosted in the vP specifier and the VP complement, both have a non-inherent referent feature as well as an interpretable referent feature, following the principles outlined earlier in Section 8.2.1.3. The heads of the verbal projections IP and vP host non-inherent referent features as well ('1' and 'a' indicate the referent loci marked by the verb), which subsequently match with the features in the argument DPs; licensing occurs through interpreted agreement made available by interpretable features in the DPs. Eventually, alignment of the agreeing verb with the loci of its subject and object results from movement operations of the verb in the V-head; see Section 8.3.1 for further discussion.²²

²²The reason the matter is addressed separately is because the discussion is somewhat more speculative in nature. The corpus data show clear patterns, but also variation, with respect to constituent order in constructions with agreeing verbs, as well as other verb types. However, they cannot tell us which factors may affect constituent order, such that I can only make informed guesses about underlying syntactic structure and movement op-

In the case of a null argument, I propose that – as with body-anchored verbs – the verb’s features determine interpretation. That is, depending on which argument gets dropped, an interpretable referent feature is inserted in the head of I or *v* as a last-resort strategy to yield the intended interpretation of the reference of the subject or object. The structure of an example with a null subject is represented in (16).

(16) ‘[I] am teaching a student.’



8.2.2.1 Backward verbs

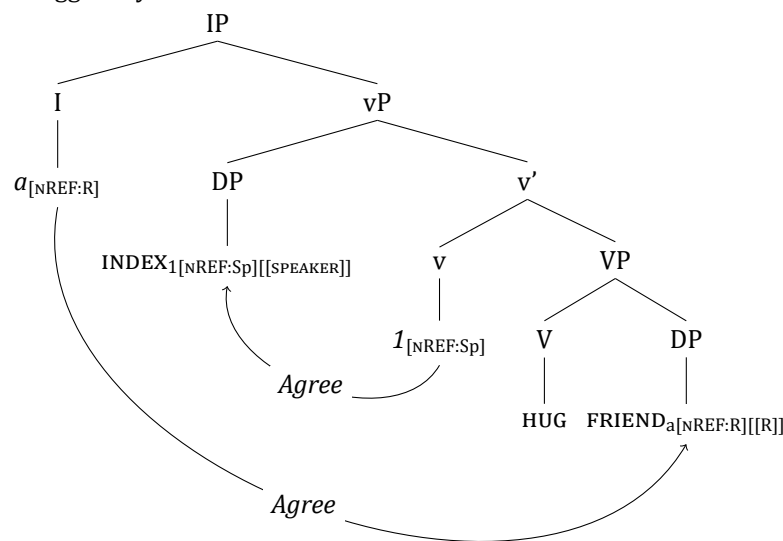
So far, I have modeled the agreement process with regular agreeing verbs, but backward verbs need a different treatment. It appears that my account is compatible with the analysis of backward verbs proposed by Pfau et al. (2018), also for DGS. Building on Müller (2009), who proposes a formal analysis of ergative constructions in spoken languages, Pfau et al. (2018) claim that backward verbs involve a reversal in the order of syntactic operations: Merge of the external argument is applied before Agree, such that *v* agrees with the subject instead of the object.²³ Agree subsequently takes place between I and the object, since the subject is no longer available for agreement. Phonologically, this spells out as a verb

²³Agree between *v* and the subject is assumed to be subject to m-command; for further technical details, see Müller (2009) and Pfau et al. (2018).

with a path movement that goes from object to subject, that is, a backward verb.

The structural representation of backward verb constructions, based on Pfau et al. (2018), but slightly tweaked to conform to the featural system I proposed in Section 8.2.1.3, is represented in (17).

(17) 'I hugged my friend.'



8.2.2.2 From body-anchored to agreeing

As pointed out various times in previous chapters, some body-anchored verbs may develop into agreeing verbs, often via an intermediate step in which the body-anchored verb starts to display object agreement (e.g. Engberg-Pedersen, 1993; Meir, 2012; Meir et al., 2007). Several such 'hybrid' forms are attested in the DGS corpus data. In Chapter 3, I hypothesized that such diachronic change occurs along certain semantic dimensions, such that predictions can be made about which verbs from particular semantic categories are most likely to undergo such a change. Although the corpus data do not provide diachronic evidence, I showed that the hybrid forms in the data set occur in semantic categories that include a mix of body-anchored and agreeing verbs, in line with our expectations. While it may still not be concluded that these hybrids were originally body-anchored verb forms,

Pfau et al. (2018) provide some evidence that DGS at least allows such sort of change: they report that the DGS verbs *TRUST* and *CALL-BY-PHONE* underwent precisely this two-step development from body-anchored to agreeing verb. With this in mind, let us consider which formal changes must occur for a body-anchored verb to develop into an agreeing verb.

First, a non-inherent referent feature needs to be introduced in the v-head to trigger Agree with the object by probing downward to match with the object's referent features. Of course, this step may only occur if there is an object for the verb to agree with, thus excluding body-anchored verbs that are semantically intransitive. Phonologically, the non-inherent feature in v is realized as object agreement. There is still an inherent first-person feature in I, however, forcing a fixed initial (or, in the case of a backward verb, final) place of articulation of the verb on the body.²⁴

The next step is for the verb to, as Meir et al. (2007) put it, 'detach' from the body. In formal terms, this means that the inherent first-person feature on the verb becomes a non-inherent feature which may take any value. The result is a double agreeing verb form. There may be general pressures to reduce iconicity at work that motivate this latter change. Although my account expressly does not put any iconic elements in the syntactic structure per se, I have argued that iconicity plays an important role in the featural content of lexical items, which subsequently impacts on the syntactic derivation. There may be a general tendency to shed such iconically motivated features from the agreement system (or any other grammatical system, for that matter) over time in lieu of a more conventional syntactic apparatus such as, in this case, a non-inherent feature on the verb.

8.2.3 Accounting for neutral verbs

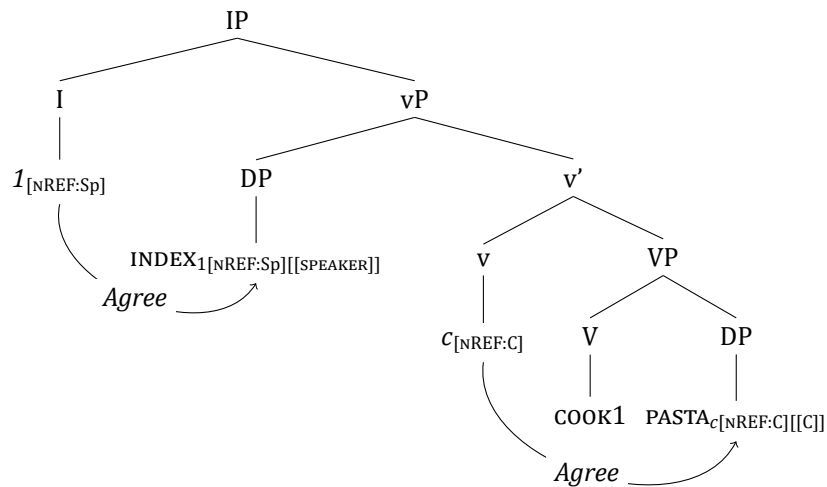
In Chapter 5.3.3, I showed that neutral verbs have the ability to localize at the R-locus of either the internal argument in transitive constructions, or that of the sole available argument – be it internal or external – in intransitive constructions. Based on this pattern, I propose that neutral verbs underlyingly agree with both their subject and object, if present.²⁵ As such, the structure of transitive construc-

²⁴This also means that the restriction on non-first person subject drop still applies with these hybrid verbs.

²⁵It should be pointed out that the corpus data included several examples where no agreement appeared to be instantiated at all. In other words, it seems that localization is to a certain degree optional, while the analysis here presumes agreement marking to be

tions with neutral verbs is identical to that of constructions with agreeing verbs (18).

(18) 'I'm cooking pasta.'



Importantly, however, neutral verbs are phonologically blocked from overtly expressing double agreement, such that only one agreement feature gets spelled out. Since Agree with the internal argument takes place before Agree with the external argument, the former gets fed to PF first and is thus the feature that gets spelled out first.²⁶

There is one difference between the representation in (18) and the representation of regular agreeing constructions displayed earlier in (15): the object of the neutral verb is specified with the feature 'C' (for center) instead of 'R'. The reason for this difference is that the corpus data provide clear indication that inanimate arguments, which frequently occur with neutral verbs, tend to be localized at the center of the signing space (see Chapter 5.3.3). Thus, there appears to be a dichotomy between animate and inanimate arguments regarding the kind of locus they typically get assigned in the signing space.²⁷

obligatory. The issue of optionality is addressed in Section 8.3.4.

²⁶This proposal is accordant with an account offered for Libras by Lourenço (2018, p. 131), who states that "single agreement verbs [i.e. neutral verbs] can only spell-out the value of a single probe".

²⁷See Chapter 5.3.3 for arguments that the center of the signing space should be considered as a legitimate locus available for agreement purposes. In Section 8.3.5, I show that

I suggest that the fact that the center of the signing space may be used as a referent locus does not pose any actual problems for the account; the basic locus assignment mechanism for animate vs. inanimate referents simply differs slightly. Remember that the R/L feature is an abstract feature whose value is determined within the context of a discourse, such that newly introduced referent loci will always be spatially opposed to previously introduced loci (Steinbach & Onea, 2016). In Steinbach and Onea (2016), only examples with animate arguments are considered, and thus the authors propose that the first referent to be assigned a locus within a discourse will typically be localized toward either the signer's left or right, with the next referent being localized on the opposite side.

I propose that this mechanism works slightly differently for inanimate arguments, which may be explained by the differences in thematic roles typically associated with these arguments, as well as pragmatic factors. Animate referents are relatively versatile with regard to what type of thematic roles they might take up: they may be agents or experiencers, but also patients. Inanimate arguments, on the other hand, tend to be more patientive in nature – which is arguably more befitting of a 'basic' place of articulation like the center of the signing space.

Secondly, it often happens that no more than one inanimate referent is active within a particular stretch of discourse. Of animate referents, on the other hand, there tend to be several. Even when there are a number of inanimate referents present in the context, it is often the case that they participate in entirely separate events, such that no relation between them is established. In the case of animate referents, it is much more likely that they are contrasted or opposed to one another, again partially because they are more flexible with regard to their thematic roles.

Signers, then, may take the factors above into account when setting up their referent loci, which results in animate arguments being assigned the value R (or L) first, followed by L (or R) and so on, while inanimate arguments usually get assigned the value C. Importantly, this C-feature cannot be inherent to inanimate referents, as there are examples in the corpus data where the inanimate arguments are associated with non-center loci. One of those is presented in (19), repeated from example (32) in Chapter 5.3.3.1. In this biclausal construction, SPAGHETTI and TOMATO are localized at contrasting loci on the left and right.

impersonal subjects may also be associated with the center of the signing space.

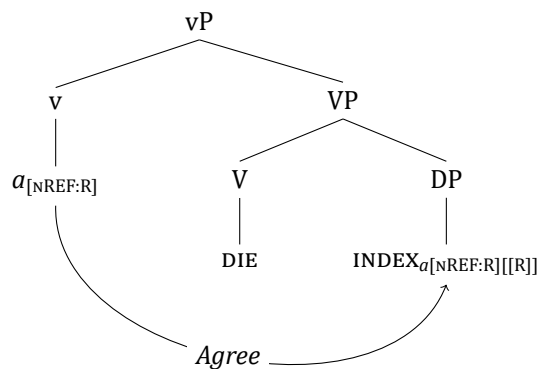
- (19) FATHER SPAGHETTI_a **BOIL**_a \ TOMATO_b CUT_b
 'Father boiled the spaghetti and cut the tomato.'

Based on the discussion above, I propose the locus assignment mechanisms for animate vs. inanimate arguments spelled out in (20) below.

- (20) a. **Animate:**
 ... R ... L ... RR ...
 b. **Inanimate:**
 Standard: ... C ...
 Contrast: ... R ... L ... RR ...

To conclude this discussion, let me point out that, cross-linguistically, there is nothing unusual about the notion that animate and inanimate arguments would trigger different grammatical behavior: it has been shown for a wide range of typologically diverse spoken languages that animacy may affect grammatical components such as case, gender or agreement marking (see e.g. Corbett, 2006; Dahl, 2011; Dixon, 1994; Silverstein, 1976, among many others). Indeed, such observations have motivated the development of animacy hierarchies (e.g. Croft, 2003; Silverstein, 1976).²⁸

- (21) 'He died.'



²⁸Interestingly enough, impersonal subjects, as well as null non-specific or generic objects, also tend to associate with the center of the signing space. Thus, there appears to be a link between (low) referentiality and use of the center of the signing space; see Section 8.3.5 for (some) further discussion.

Intransitive neutral verb constructions simply involve one Agree operation. The structural representation of a construction with the unaccusative neutral verb DIE1, with a referent feature in the v-head, is depicted in (21). It is assumed that this verb takes an internal argument.

There is one final issue I briefly wish to address. Recall that neutral verbs must be articulated in the signing space and thus cannot be signed on the body, such that first-person agreement cannot be expressed.²⁹ I suggest this is entirely a phonological restriction. That is, the referent features involved are the regular first-person features ([NREF:Sp] and [[SPEAKER]]), but they are simply not pronounced. Instead, the verb gets articulated at the center of the signing space by default. Note that this use of the center of the signing space differs from the localization of a neutral verb at the same location to align with the locus of an inanimate argument: in the latter case, I suggested that the phonological realization of the verb actually corresponds to the syntactic features it is specified with.

8.2.4 Interim summary

To summarize, I laid out a unified analysis of constructions with body-anchored, agreeing, and neutral verbs, arguing that all three verb types can be accounted for within the same framework using the same general syntactic mechanisms.

First, I developed a formal account of body-anchored verb constructions, in which I drew a comparison to mixed gender agreement as attested in spoken languages such as Russian (Matushansky, 2013). Specifically, I argued that body-anchored verbs bear an inherent speaker-referent feature, which, in the absence of an overt subject, leads to a first-person interpretation. A consequence of such an approach is that when a third-person overt subject is combined with a body-anchored verb, this leads to a mismatch. I proposed that this clash does not lead to a derivation crash because of an interpretable feature on the subject, which overrides formal features.

The formal analysis uses modality-independent mechanisms of feature checking and mixed agreement. At the same time, it captures the argued modality effect – or rather, iconicity effect – of body-anchoring triggering a first-person interpretation through the proposal that body-anchored verbs bear an *inherent* speaker-referent feature. Thus, while I do not appeal to iconicity directly in the grammat-

²⁹However, it is worth reiterating from Chapter 5.3.3 that some neutral verb forms appear to have some limited ability to localize on the signer's body.

ical analysis itself, it serves as a background for motivating specific grammatical properties of verbal signs.

Agreeing verb constructions differ syntactically from body-anchored verb constructions in two ways. Firstly, since the verb may be modified to align its initial (or final) place of articulation with the subject locus, I posited a non-inherent rather than an inherent feature in the I-head, meaning that subject drop is no longer restricted to first-person referents, as is the case with body-anchored verbs. Secondly, since agreeing verbs also overtly agree with their object, referent features are present in the v-head, too.

Transitive neutral verb constructions are structurally identical to agreeing verb constructions; that they may only overtly express agreement with a single argument is the result of a phonological blocking effect. The argument the verb expresses agreement with is the internal argument, as it is positioned lower in the structure and thus gets spelled out first. In intransitive constructions with neutral verbs, localization of the verb occurs at the locus of the only present argument.

As suggested in Chapter 3, iconicity seems to play a role in the realization of verbs as different types. In my account, however, these phonological differences translate only minimally into formal differences. Only body-anchored verb constructions are affected by iconicity, although it is important to point out that the inherent feature that I claim to be associated with this type of verb is not modality-specific *per se*: in spoken languages, inherent features also exist – they just occur with (pro)nominal elements rather than verbs. As such, I clearly distinguish modality-general linguistic principles and modality effects.

The next section is devoted to discussing some outstanding issues.

8.3 Outstanding issues

Several issues have not yet been addressed in the analysis above yet merit some further discussion. Generally, the matters discussed in this section are somewhat more speculative in nature and require further data analysis and/or testing; the discussions below may serve to guide future research into these topics.

First, in Section 7.3, I showed that body-anchored, neutral, and agreeing verbs display different ordering preferences, in particular with respect to the position of the object relative to the verb. These constituent order patterns have been neglected in the formal analysis, in which I primarily focused on the workings of the agreement mechanism. In Section 8.3.1, I consider which movement operations

take place in constructions with different verb types to derive the different constituent order preferences.

Second, I have not yet discussed how the DGS agreement auxiliary usually referred to as person agreement marker (PAM; see Chapter 1.2.4) may interact with verbs of the different types. The reason for that is simple: there are only a handful of constructions in the corpus data which contain PAM. I analyze these constructions and measure them up against the findings reported by Macht (2016), who has previously carried out a more substantial study on constructions with PAM based on (a larger set of) data from the DGS Corpus. Building on her findings, I consider in Section 8.3.2 how constructions with PAM can be integrated into the general account.

Third, I pointed out in Section 8.2.1.6 that object drop is allowed in transitive constructions with body-anchored verbs, thus raising the question how such null objects are licensed. This matter is addressed in Section 8.3.3.

Fourth, in the formal analysis for neutral verbs in Section 8.2.3, I assumed localization to be obligatory, yet I also attested a number of counterexamples to this assumption in the data. In addition, both DGS informants were resolute in their judgment that localization of neutral verbs is possible yet not required. The issue is further discussed in Section 8.3.4.

Finally, in Section 8.3.5, I devote some space to discussing impersonal constructions. The DGS corpus data contain 281 impersonal constructions, but these were excluded from the analyses in previous chapters as they warrant independent investigation, which falls outside the scope of this dissertation. Nonetheless, since many impersonal constructions involve pro-drop, and null subjects form a crucial aspect of the formal analysis for body-anchored verbs, it is important to qualify how impersonal pro-drop subjects are different.

8.3.1 Movement and constituent order

The structural representations for clauses with body-anchored, agreeing, and neutral verbs in Section 8.2 do not necessarily derive the most common surface constituent orders for each verb type. As described in Section 7.3, the corpus data reveal interesting differences in ordering preferences across verb types, in particular with regard to the ordering of the object relative to the verb. While body-anchored verbs favor postverbal objects (70% VO vs. 30% OV; excluding examples involving object topicalization or verb/object sandwiches), agreeing verbs

show the reverse preference (64% OV vs. 36% VO), and neutral verbs even more strongly prefer preverbal objects (96% OV vs. 4% VO). These results suggest that there must be some connection between verb type and constituent order (also see Napoli & Sutton-Spence, 2014).

Since I have not thoroughly investigated the factors that may affect constituent order beyond verb type, it is not possible at present to make any strong claims about both the underlying order of DGS clauses and the movement operations that take place, and under what conditions, to yield particular surface orders. Still, since the corpus data provide some evidence for a correlation between surface constituent order and verb type, I consider it worth speculating about some possible explanations for this relation.

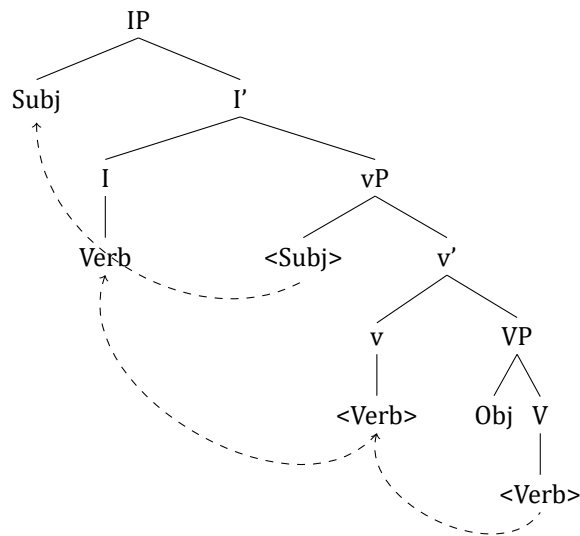
Napoli and Sutton-Spence (2014) observe on the basis of previous literature (see e.g. Kegl, 2004a, 2004b; Milković et al., 2006; Sze, 2003; Vermeerbergen et al., 2007) that there is a propensity across sign languages for modifiable verbs to occur in clause-final position, while plain verbs tend to precede the object. From this, they draw the generalization that arguments that affect the articulation of a verb precede the verb. That is, objects in clauses with agreeing and neutral verbs are expected to occur preverbally, while objects in clauses with body-anchored verbs are expected to be found in postverbal position. Such an analysis implies that SVO is the underlying constituent order in sign languages displaying such a pattern, with SOV being the derived order. Formally, this derived order could be achieved by verb movement toward a functional head structurally toward the right of the argument(s) it agrees with, in order to instantiate agreement.

Although the analysis above generally fits with the general constituent order tendencies attested in the DGS corpus data, there is one caveat: I claim that body-anchored verbs do agree with their subject, such that the verb is, in fact, expected to move higher up in the structure to agree with this argument. As such, the final landing site of body-anchored verbs would be predicted to be the same as that of agreeing and neutral verbs. In other words, the SVO order which is preferred in constructions with body-anchored verbs is actually predicted to be a derived order.

Since several studies report that DGS has basic SOV order (e.g. Bross, 2018; Bross & Hole, 2017; Pfau & Glück, 2000; Pfau et al., 2018; Steinbach & Herrmann, 2013), some of which additionally provide syntactic evidence for this claim, let us assume that this is, indeed, the underlying order in DGS. The structure in (22) schematically represents how SVO order could then be derived from SOV order. In

the structure, the verb moves to the head of the IP to pick up its referent features, matching with those of the subject. After Agree has taken place, the subject moves upward to the specifier of the IP.

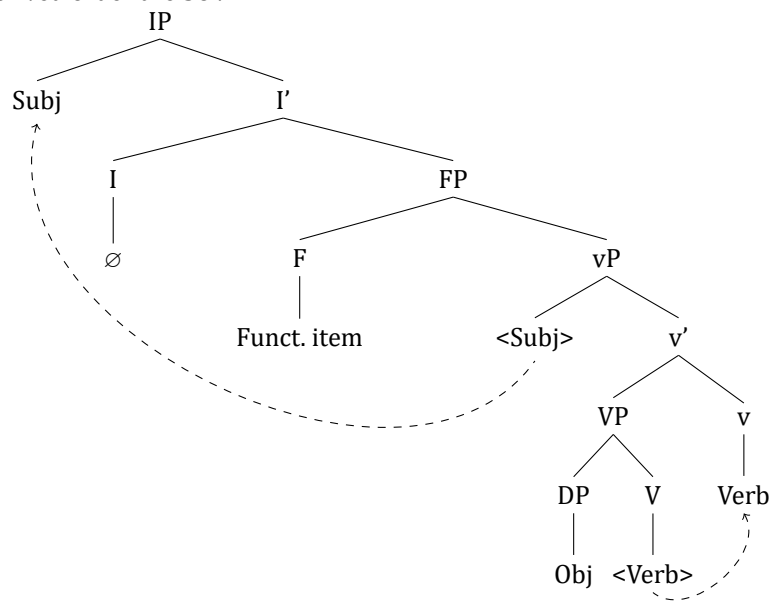
- (22) Basic clausal structure in DGS; the verb moves for agreement purposes, deriving SVO order from an underlying SOV order.



However, the structure in (22), yielding SVO order, cannot account for the presumably derived SOV order that is preferred in clauses with agreeing and neutral verbs, and which is even fairly common in constructions with body-anchored verbs. I offer two potential suggestions for how SOV order may be derived; further study is required to assess these propositions.

Firstly, movement of the verb could be blocked by material present in an intervening functional head, e.g. Neg, such that the Head Movement Constraint (Travis, 1984) applies and the verb cannot move beyond the v-head. The vP would then need to be head-final to derive SOV order. This scenario is represented in (23). Potential issues for such an account are that it is unclear how subject agreement would get realized despite a lack of movement, and why such blocking effects would be more likely to occur with neutral and agreeing verbs than with body-anchored verbs.

(23) Clausal structure in DGS with the v-head on the right, and blocking of the movement of the verb to I by a functional item in F. Both underlying and derived order are SOV.



Another possibility may be that object shift leads to variation in surface orders. Indeed, Bross (2018) has previously argued that object shift occurs regularly in DGS. Based on syntactic evidence in the form of adverb placement, Bross (2018) suggests that – as in many Germanic and Scandinavian languages (see e.g. Holmberg, 1986, 1999) – objects that are definite, specific, or otherwise more referential may be shifted toward a higher position in the clause. He proposes that such objects are specified with a definiteness feature, such that they get attracted by a functional head *Def*, which he positions below the IP.

I leave it to future work to spell out exactly how object shift may relate to different surface constituent orders. It should also be considered why object shift would be triggered more often for some verb types than others. As I showed in Chapter 3, (transitive) body-anchored verbs tend to denote experiential events with objects with a generally low degree of prominence, neutral verbs are often action verbs with highly patientive and typically inanimate objects, and agreeing verbs tend to be interaction verbs with animate but fairly patientive objects. In other words, objects have somewhat different semantic characteristics related to each verb type. Perhaps, then, there is a relation between these different object

types and the degree of referentiality of the object. Indeed, it seems plausible that the theme-like objects with body-anchored verbs are less likely to be definite or specific, and thus less likely to shift, than the animate patients of agreeing verbs. It is presently less clear why the patientive inanimate objects of neutral verbs would be more prone toward shifting. Further work into this matter may shed more light on this question.

To conclude, although it is clear that further research is required, I have offered some suggestions as to how the variation in constituent orders attested in the corpus data could be accounted for within a framework that assumes that body-anchored verbs, like the other two verb types, participate in Agree. Future research is needed to gain more insight into which of the suggestions offered above may hold up against more detailed investigation into (basic) constituent order in DGS.

8.3.2 Person agreement marker

In the formal analysis presented in Section 8.2, I did not take clauses including the agreement auxiliary PAM (see Chapter 1.2.4) into account. The reason for that is simple: just ten examples in the corpus data include this auxiliary, and there is considerable variation in these ten examples both with respect to which types of verb PAM combines with, and which position in the clause the auxiliary takes.

In six clauses, the auxiliary co-occurs with a body-anchored verb, in two cases it combines with a spatial verb, and in a further two examples, it occurs in a clause with an agreeing verb, one of which is a hybrid. As such, the data show that PAM is not restricted to co-occurring with plain verbs only, although nothing meaningful can be said about the relative frequencies with which the auxiliary combines with verbs of different types.

Three corpus examples – one with a hybrid (24a), another with a spatial verb (24b), and another with a body-anchored verb (24c) – are displayed in (24). Note that two of the three instances of PAM display marking of both the subject and the object, which is interesting because Bross (2018) reports that PAM, as it is used in southern varieties of DGS, only marks the object. Example (24c), signed by a DGS signer from the region of the southern German city Stuttgart, forms a contradiction to this claim. The other two examples are articulated by signers from other regions.

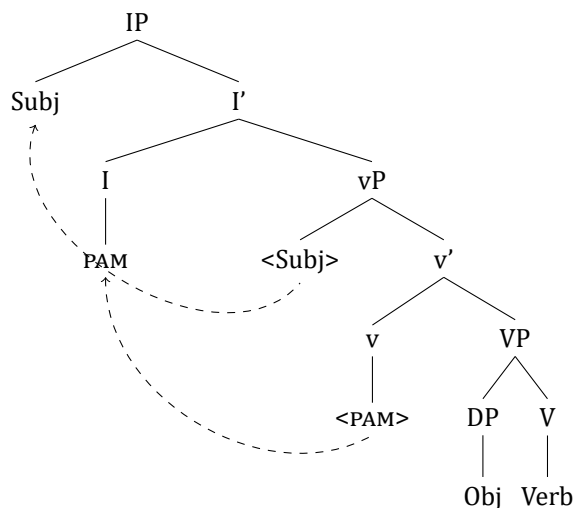
- (24) a. $\frac{\text{ht, re}}{\text{INDEX}_1 \text{ SEE WHEN SEE}_{\alpha} \text{ PAM}_{\alpha}}$
 'At what other time would I be able to see these people?'
 [koe19a-A-06:19.90]
- b. $\frac{\text{re} \quad \text{hs}}{\text{POSS}_1 \text{ MOTHER PAM}_1 \text{ THROW}_{\alpha*} \setminus \text{NO}}$
 'My mother wouldn't have sent me anywhere else.'
 [fra05-A-13:37.95]
- c. dh: $\text{INDEX}_{\alpha} \text{ KNOW1 GOOD}$
 ndh: $\text{INDEX}_{\alpha} \dots \dots \dots \alpha \text{PAM}_b$
 'They know her well.' [stu03-02:28.35]

In five clauses, the auxiliary precedes the verb, but it follows the verb in the remaining five examples, suggesting that both of these positions are allowed. Indeed, Macht (2016), who carried out a large corpus study on PAM, reports that of the 347 examples with PAM she identified, the auxiliary follows the verb in 239 (68.9%) cases, while the remaining 108 (31.1%) clauses display preverbal PAM. Importantly, Macht (2016) also notes that a regional difference can be observed: a preverbal position is preferred in southern dialects of DGS, while postverbal PAM is more common in other variants. Bross (2018) confirms that PAM tends to occur in preverbal position in his data, collected among signers from southern regions in Germany.

Since I lack the data to make any strong claims about the factors interacting with constituent order in clauses with PAM, I will not be concerned with this issue further, and I will simply assume an order in which PAM precedes the object and the verb. Rather, I wish to demonstrate how the agreement process works in such constructions.

In line with Pfau et al. (2018), I propose that in constructions with PAM, the lexical verb stays put in V while PAM is merged into v, and may subsequently move upward to I as a consequence of Agree. The structure is represented in (25). Movement operations yield an order in which PAM precedes the object and the verb, but, as pointed out above, there are certainly other constituent orders possible. Further research is required to establish how such alternative orders may be accounted for.

(25) 'I know him.'



As noted by Pfau et al. (2018), an analysis in which the lexical verb stays put in the head of the VP does not work when the verb also marks agreement. It is not entirely clear how frequent such marking is: of the examples in the corpus data, one example involves a combination of hybrid verb marking its object plus PAM (24a), and another includes an agreeing verb expressing agreement with both arguments.³⁰ Assuming, then, that double marking is possible – even though it might not occur very often – we may simply follow Pfau et al. (2018) in suggesting that constructions with double marking are actually biclausal, with PAM taking an IP-complement.

8.3.3 Object drop in body-anchored verb constructions

In Section 8.2.1.6, I raised the question how null objects are licensed in constructions with obligatorily transitive body-anchored verbs if not through agreement. Before considering possible explanations, let us determine how many such examples occur in the data set. Analysis of the 38 clauses with *LIKE* or *DISLIKE* – the only obligatorily transitive body-anchored verbs in the data set – reveals that eight of them (21%) involve a null object. Thus, it is evident that null objects are allowed.

We may turn to the spoken language literature for a potential explanation, as

³⁰Macht (2016) does not discuss the issue, and none of the corpus examples she provides appear to show double marking.

it has often been observed that many spoken languages that are usually claimed to license null arguments through agreement marking nonetheless put looser restrictions on object drop (see e.g. Cardinaletti, 1990; Cummins & Roberge, 2004; Farrell, 1990; Rizzi, 1986). Different analyses of this phenomenon have been proposed; I briefly highlight one that I believe may be of potential interest to the DGS case.

Farrell (1990), investigating informal Brazilian Portuguese, shows that the restrictions on object drop in this language are quite lenient, but that an empty topic approach (Huang, 1984) cannot account for all of the empirical facts. Farrell (1990) then goes on to show that null objects are consistently third-person arguments, and therefore proposes that these arguments have an intrinsic third-person specification.

Without going into the technical details, which would be somewhat premature given the lack of relevant data, I suggest that a similar process might be at work in DGS, although the motivation for it is different. That is, since the body of the signer associates with the verb's subject, it seems plausible that the verb's object would automatically be interpreted as *not* corresponding to the signer, and thus as a non-first person referent. Indeed, the eight null objects in constructions with a transitive body-anchored verb are all third-person referents. However, in all constructions with LIKE or DISLIKE and an overt object, the referent is also third person. This hypothesis makes the clearly testable prediction that first-person null objects with body-anchored verbs are ungrammatical. I leave it to future research to explore this hypothesis in further detail.

8.3.4 Optionality of the localization of neutral verbs

Analysis of the corpus data showed that agreement is almost always marked on agreeing verbs, but less often so with neutral verbs (see Chapter 7.5). Indeed, the two DGS informants confirmed that neutral verbs do not necessarily need to localize, even when the argument they are expected to agree with has been assigned a locus in space. Thus, it appears that agreeing verbs obligatorily express agreement marking, while it is optional for neutral verbs.

The optionality of agreement marking with verbs that have the potential to express it has been the subject of intense debate for years (see e.g. Engberg-Pedersen, 1993; Fenlon et al., 2018; Padden, 1988), as it is one of the non-canonical aspects of agreement marking in sign languages. Although the corpus data provide evi-

dence that agreeing verbs in DGS do, in fact, behave canonically, the optionality of localization of neutral verbs still poses a problem that needs addressing.

At this point, with the data I have available, I can only speculate about what provokes this optionality. Considering the attested dichotomy between agreeing and neutral verbs, it makes sense to suggest that the optionality occurring with neutral verbs is an outcome of a particular property that these verbs possess or lack. For instance, the fact that neutral verbs frequently select inanimate arguments could affect agreement marking. Indeed, a sensitivity to animacy in agreement expression is a phenomenon which is also attested in a variety of spoken languages (Corbett, 2006).

However, this explanation cannot account for constructions in which a neutral verb fails to express agreement with an animate argument, as in example (26), reproduced from (29) in Chapter 5.3.3.1. In fact, six out of 40 instances of the verb DIE1 in the corpus data are incongruent with the location of the (animate) internal argument. In contrast, there is just a single construction in the corpus data in which the neutral verb fails to align its place of articulation with that of an inanimate argument.³¹ Thus, optionality of localization cannot be explained by considering inanimacy as a factor.

(26) THEATER FACIAL-EXPRESSIONS GREAT \ UNTIL DATE INDEX_a DIE1_c PU
 SV \ # SV
 ‘His facial expressions were always spectacular in the theater, up until the
 day he died.’ [koe18-A-00:25.45]

An alternative explanation may be that discourse factors play a role, in particular whether or not a contrast of sorts between referents is being expressed. That is, with intransitive neutral verbs such as DIE1, there might simply be little incentive for a neutral verb to phonologically realize agreement when there is just a single referent present in the context. If agreement with inanimate arguments in transitive constructions also turns out to be optional, this could be explained in similar terms: while there are two referents involved, only one of them – the internal argument – is a logical candidate for being the inanimate argument. With agreeing verbs, on the other hand, there are usually two animate

³¹I should point out, however, that there are a number of cases annotated as ‘unclear’, and there are a lot of examples where both the inanimate argument and the verb are articulated at the center of the signing space. I have argued that these congruent examples may also be analyzed as agreement, but examples involving spatial displacement of arguments and/or the verb would be more informative in this regard.

referents involved, which could in principle both function as either syntactic argument. Agreement marking is required to explicate which referent represents which grammatical role.

Formally, one could go the way of Pfau et al. (2018) and propose an impoverishment rule à la Bonet (1991) or Halle and Marantz (1993). This rule optionally deletes the referent features of the internal argument – be it animate or inanimate – from the verb, resulting in a less specified lexical item. In the case of a neutral verb, the deletion of this feature leads to the articulation of the verb at the center of the signing space. As such, I propose that the center of the signing space has a dual function. It may be used as a genuine referent locus, as with inanimate arguments that get localized at the center of the signing space, but – being the least specified location in the signing space – it also serves as the place of articulation of neutral verbs which have undergone impoverishment. Formally, these two functions are different.


8.3.5 A note on impersonal constructions

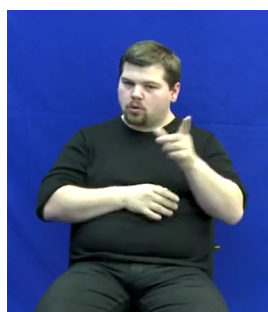
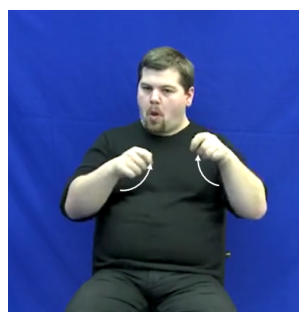
The set of corpus data contained 281 examples with (at least) an impersonal subject. These cases were excluded from further analysis, as such constructions are known to be characterized by distinct properties across sign languages that call for a separate treatment (see Chapter 1.2.6). Nonetheless, in light of the theoretical account presented in this chapter, there are two reasons why I briefly want to touch upon the topic in this section.

Firstly, a common strategy used across sign languages to form an impersonal construction is to use a null subject (see, for instance, the contributions in Barberà & Cabredo Hofherr, 2018). Since null subjects play a key role in the analysis of body-anchored verb constructions, it is important to address how null subjects in impersonal constructions should be treated. Secondly, the DGS corpus data show that verbs that can be modified tend to use a default place of articulation when they occur with an impersonal argument, which is typically the center of the signing space (see below for further details). It is worth considering how this phenomenon should be viewed within the general theoretical framework I have proposed.

It is not my aim to present a detailed overview of agent-backgrounding strategies attested in DGS, but it is clear that the strategies that can be found in the data are similar to those described for other sign languages (see Chapter 1.2.6 for a

concise overview of the literature). By far the most common strategy is the use of a null subject (27a), but the data also include quite a few instances with an impersonal third-person pointing sign, which tends to be articulated somewhat higher in the signing space, as in (27b) and (27c).³² The impersonal pronoun and the neutral verb in (27b) are illustrated in Figure 8.4. This observation appears to be in line with the claim made by Barberà (2012) for Catalan Sign Language that high loci are associated with non-specificity, although further study is required. I could not find examples in the data set with indefinite pronouns such as *SOMEONE*.

- (27) a. *^aTAKE2* CAN PU
 ‘You can cherry-pick [actors].’ [mst01-A-05:23.55]
- b. *INDEX₁* EXPERIENCE \ ALREADY *INDEX_{u,p}* **BUILD1++** CL():TOWER++
 ‘I heard that they are already building new towers.’ [fra01b-A-04:58.75]
- c. MUCH *INDEX_{u,p}* **TEACH₁**
 ‘They had to teach me a lot.’ [fra05-B-03:51.70]

(a) *INDEX_{u,p}*

(b) BUILD

Figure 8.4: (a) The upward third-person pronominal sign, and (b) the verb BUILD1 from example (27b).

As mentioned above, in impersonal constructions with a null subject, verbs with agreement properties tend to use a default place of articulation at or close to the center of the signing space. Two examples are displayed in (28), with the articulation of the verbs illustrated in Figures 8.5a and 8.5b, respectively. Another

³²Hansen (2007) has previously argued that there is an additional, non-manual, means to mark impersonal arguments, namely an averted, downward, eye gaze. I have not looked into eye-gaze patterns, so I cannot say anything about the systematicity of this kind of marking in the corpus data.

example has previously been demonstrated in (27a); note that TAKE2 is a backward verb, and as such agreement with the impersonal null subject is expected to occur at the final place of articulation of the verb.

- (28) a. GOLD-MEDAL HAND **GIVE_α**
 'They might give him the golden glove.' [ber04-A-11:54.05]
- b. LETTER **SEND2**
 'People used to have to send letters.' [stu03-A-03:45.00]

(a) GIVE_α

(b) SEND2

Figure 8.5: Articulation of the verbs GIVE from (28a) and SEND2 from (28b) at a default place of articulation.

It is further interesting to note that (28b) does not just involve a null impersonal subject, but also an unspecified goal/recipient argument, which is the argument that the verb would be expected to agree with at the end of its trajectory. As can be observed from Figure 8.5b, the signer uses the citation form of the verb SEND2 in this example, which involves a short path movement from a location somewhat closer to the signer to a location somewhat further away from it.³³ I consider both the initial and final loci to be places of articulation close to the center of the signing space, rather than aligning with the first-person locus and a distinct right/left locus, respectively. Overall, the corpus data indicate that low referentiality, but also non-specific or unspecified arguments, tend to be associated with verbs being articulated at or close to the center of the signing space.

Kegl (1990) argues that the articulation of verbs at the center of the signing space provides support for analyzing constructions including such verbs as mor-

³³ Also note that the verb is articulated fairly high on the vertical plane, which potentially serves as a way to indicate un-/non-specificity of the arguments the verb is expected to mark (in line with Barberà, 2012).

phological passives (see Chapter 1.2.6). However, I am uncertain whether this is the only possible logical conclusion. Instead, I would suggest that impersonal arguments, as well as the verbs that agree with them, are specified with the non-inherent feature 'c' (for center). As such, null impersonal arguments are proposed to have the same feature specification as inanimate arguments are usually associated with (see Section 8.2.3). As suggested above, factors such as referentiality and specificity appear to play a role here, where arguments with a lower degree of referentiality or specificity are more likely to be assigned an R-locus at the center of the signing space. An in-depth exploration of this phenomenon falls outside the scope of this dissertation, but it seems to me to be a fruitful area for future research.

8.4 Conclusions

In this chapter, I presented formal analyses of constructions with spatial, body-anchored, agreeing, and neutral verbs, based on the descriptions of their semantic and morphosyntactic properties presented in preceding chapters. A systematic comparison between the four verb types in Chapter 7 led me to conclude that spatial verbs are sufficiently different from the other verb types to warrant independent treatment, while the remaining three verb types show similarities that motivate a unified analysis.

I proposed that spatial verbs have a demonstration component to account for their variable behavior with respect to their initial and final places of articulation. I argued that the path movement of spatial verbs demonstrates a spatial trajectory, where the beginning and end points may represent locations or referents, but they might also represent movement of a referent from a location close to the signer to a location far away from the signer. Signers choose the type of path movement according to the Gricean Maxim of Quantity, i.e. depending on which information is important to specify within the context.

Spatial verbs do not have to align with referent loci – indeed, they frequently do not – yet subject drop with this type of verbs is common. In line with Kimmelman (2018c), I suggested that demonstration relaxes the identification rules of these null subjects, with components of the demonstration allowing for the recoverability of null arguments in constructions with spatial verbs even if agreement is not overtly marked.

Body-anchored, neutral, and agreeing verbs, I argued, do license null sub-

jects through agreement. This claim is not so remarkable for verbs with modification properties, for which similar suggestions have been made more often in the literature; however, body-anchored verbs are generally analyzed as not expressing agreement at all. Although it is true that such verbs cannot be modified, I argued that this is due to their iconically-motivated place of articulation on the body, which – crucially – also happens to be associated with first person. I showed that null non-first person subjects are dispreferred in body-anchored verb constructions, which I took as evidence that body-anchoring triggers an automatic first-person interpretation in the absence of an overt subject, such that only first-person subjects may be dropped.

In the syntactic analysis I presented to formalize this idea, I posited that body-anchored verbs come with an inherent speaker-feature value. ‘Speaker’ is one of the possible values of the referent feature I have claimed is operative in DGS (and other sign languages), and it is the sign language equivalent of the ‘person’ feature more familiar from spoken languages. The existence of a referent feature is motivated by the fact that (non-first person) referents get assigned specific, distinct, locations in the signing space. Within a discourse, such R-loci uniquely pick out the referent to which they have been assigned, while these same R-loci may be associated with entirely different referents in the next discourse. I followed Steinbach and Onea (2016) in proposing that non-first person referents participate in a system of maximal contrast, where each new referent introduced in the discourse becomes associated with a locus that is maximally contrastive to the previously introduced loci. Thus, whereas the verb is specified with an inherent feature value due to its fixed place of articulation, nominal and pronominal arguments are endowed with non-inherent values because their R-locus is discourse-dependent.³⁴

In principle, agreement between the body-anchored verb and the subject is instantiated by means of feature matching. However, when there is a non-first person subject, a mismatch arises between the features of the subject and the features of the verb. To account for such cases, I followed Matushansky (2013), who presents an account of a similar matching problem in gender marking in spoken Russian, in proposing that interpretable features override formal features. Indeed, in line with Steinbach and Onea (2016), I claimed that overt subjects have an interpretable feature, the semantic content of which is to track a referent in space. This feature overrides the non-inherent speaker feature associated with

³⁴First-person arguments are specified with a non-inherent feature value on the assumption that they form part of the same paradigm as non-first person arguments.

the body-anchored verb, yielding the correct non-first person interpretation.

In the case of a null subject, which I stipulated has a non-inherent feature but does not have an interpretable feature, since the R-locus of the null subject is not overtly signaled in space, the interpretation of the subject has to come from the verb. That is, the verb introduces an interpretable feature as a last-resort strategy to ensure interpretation of the structure. This interpretable feature can be introduced because of an iconic mapping between the body of the signer and first person, thus forcing a first-person interpretation of the null subject.

The general mechanics of the agreement system were subsequently applied in the analyses of constructions with agreeing and neutral verbs. I proposed that these verbs have a non-inherent instead of an inherent referent feature, since – unlike body-anchored verbs – they do not have a fixed place of articulation. The referent features associated with both agreeing and neutral verbs agree with those of their subjects and objects through matching. However, neutral verbs are only able to overtly realize agreement marking for one of their arguments, which I argued is the result of a phonological blocking effect. Since Agree with the internal argument takes place before Agree with the external argument, it is the referent feature associated with the former that gets spelled out.

Thus, I proposed a unified analysis of body-anchored, agreeing, and neutral verb constructions in terms of agreement, showing that, despite obvious differences on the surface, much of the underlying syntax is the same. As such, the account offers a solution to a much-debated issue in the sign language literature, i.e. the question of why only a subset of verbs expresses (double) agreement, and others do not. The analysis also makes it easier to formally account for the observation that some body-anchored verbs may develop into agreeing verbs: since both verb types make use of the same general agreement mechanism, only differing in a couple of feature specifications, relatively little needs to change in order for such a change to happen.

The chapter concluded with the discussion of a number of outstanding issues to which I could not provide a definitive answer due to a lack of data. These included questions about what might underlie the relation between constituent order preferences and verb type, how PAM interacts with the general system I proposed, how object drop is licensed in body-anchored verb constructions, why neutral verbs allow a certain degree of optionality of agreement marking, and how null impersonal subjects should be treated within the framework I have set out. In the discussion of these topics, I offered a number of suggestions to open up new

areas of future research within these domains.

CHAPTER 9

Concluding remarks

THIS dissertation has presented a detailed examination of verbs in German Sign Language (DGS) based on naturalistic data from the DGS Corpus. The primary goal of the investigation was to characterize the verb classification system in this language. Taking phonological properties as a point of departure, I started the study by distinguishing between verbs articulated on or near the body (body-anchored verbs), verbs articulated at a modifiable location in the signing space (neutral verbs), and verbs with a modifiable path movement (agreeing verbs; including spatial verbs).

The main goals of this work were (i) to identify the semantic and morphosyntactic properties of different verb types, (ii) to identify which properties are shared across different verb types and which are type-specific, (iii) to characterize the role of iconicity in the formational characteristics and morphosyntactic behavior of verbs of different types, and (iv) to determine whether constructions with verbs of different types have a shared or distinct underlying syntactic structure.

The contributions of the investigation to the study of DGS, sign languages, and human language in general are highlighted in Section 9.1. I consider the methodological shortcomings of the research presented in this dissertation in Section 9.2. In Section 9.3, I provide directions for future research into verbs and verb classification in sign languages.

9.1 Outcomes of this dissertation

In this section, I discuss the main findings of the study by taking an increasingly broader perspective. In Section 9.1.1, I describe how the results contribute to the linguistic description of DGS, the language this dissertation has focused on. Many of the key issues that have been addressed in this dissertation with respect to verb classification are equally relevant to other sign languages; I therefore explore in Section 9.1.2 what we may learn from the DGS-specific results about the structure of sign languages in general. In Section 9.1.3, I consider what the results may tell us about human language. In particular, I expound on which properties of verbs appear to be modality-specific and which seem modality-independent.

9.1.1 German Sign Language

This thesis has presented a corpus-based description and analysis of 1,063 clauses containing 107 different DGS verb forms representing 58 verb meanings. These

verb meanings are part of the ValPaL-list (Hartmann et al., 2013; Malchukov & Comrie, 2015), which was specifically designed to be representative of the verbal lexicon in language. As such, analysis of the data set annotated for this work was expected to produce an illuminative snapshot of verbal constructions in DGS.

I started the investigation by making an initial division between verb forms based on their place(s) of articulation, which led to a preliminary verb classification of three types: body-anchored verbs, neutral verbs, and agreeing verbs. This division diverges from Padden's (1988) classic tripartite verb classification based on ASL data, in which body-anchored and neutral verbs are subsumed under the single category of plain verbs, while an additional distinction is made between agreeing verbs that agree with person (regular agreeing verbs) and agreeing verbs that agree with location (spatial verbs). In the annotation of the corpus data, I maintained a lower-level distinction between spatial and regular agreeing verbs in order to allow systematic comparison to establish whether collapsing them into a single category is justified.

Scrutiny of the DGS Corpus data provided morphosyntactic evidence that a distinction between regular agreeing verbs and spatial verbs is warranted in DGS. In particular, I showed that the corpus data provide evidence that modification properties of agreeing verbs are controlled by referential loci, while there are much looser restrictions on the modification properties of spatial verbs. The corpus data indicated that agreement marking with regular agreeing verbs may be obligatory in DGS: examples with incongruence between the place of articulation of the verb and the R-locus of the relevant referent were extremely scarce. This is a noteworthy finding, as it has previously been suggested that agreement marking in DGS, as in many other sign languages, is optional (see Pfau et al., 2018). Although optionality of agreement marking does not necessarily force the conclusion that there is no grammatical agreement in a sign language (see e.g. Lillo-Martin & Meier, 2011), the near-universal presence of such marking in DGS makes a strong case for an agreement approach.

In fact, I argued that there are sufficient grounds to pursue a unified formal analysis of body-anchored, neutral, and agreeing verbs in terms of agreement, based on an analysis of the morphosyntactic properties of these verb types in DGS.¹ For body-anchored verbs, I showed that they commonly occur with a null first-person argument but resist null non-first person subjects. Neutral and agree-

¹I should note, however, that neutral verbs were shown to allow for a somewhat higher degree of optionality in agreement marking; this issue merits further study.

ing verbs, on the other hand, do not put person restrictions on subject drop. From this observation – which also provides an important argument for distinguishing between body-anchored verbs and neutral verbs – I concluded that body-anchoring triggers an iconically-motivated association with first person, such that a null subject automatically receives a first-person interpretation. This pattern can be taken as evidence that body-anchored verbs participate in Agree. Formally, I proposed that a body-anchored verb introduces a semantic feature in the absence of an overt subject to yield a first-person interpretation. As such, I consider body-anchoring to be more than just a phonological blocking effect (cf. Keller, 1998).

As for neutral verbs, I showed that these have the ability to align with the locus of one of their arguments. The corpus data additionally indicated that the locus neutral verbs align with consistently is the one associated with the internal argument in transitive constructions, or the only available argument in intransitive constructions, be they unergative or unaccusative. This observation provides support for the hypothesis that neutral verbs in DGS, too, grammatically agree with their arguments, as they show a sensitivity to syntactic structure: neutral verbs – phonologically restricted to express agreement with a single argument – express agreement with the structurally lowest argument.

Another interesting finding related to neutral verbs is that they tend to be articulated at the center of the signing space when they occur with inanimate internal arguments. As it happens, such arguments tend not to be localized on the signer's left or right – as animate arguments usually are – but are rather associated with the center of the signing space, as well. Indeed, null impersonal arguments were also frequently associated with the center of the signing space, as were the occasional generic or non-specific arguments in the data. Thus, it seems that the center of the signing space in DGS functions as a legitimate R-locus for referents with low referentiality.

The different properties of body-anchored, neutral, and agreeing verbs discussed above indicate that they constitute different types while at the same time involving a similar underlying structure. The interrelation between the verb types was also highlighted in the semantic analysis presented in Chapter 3, which showed that there is some meaningful semantic overlap between the different verb types.

In general, body-anchored verbs in DGS tend to denote events of experience, neutral verbs often express either prototypically transitive or prototypically in-

transitive (unaccusative) events, while agreeing verbs often involve an interaction between event participants. Yet, revealingly, verb forms from semantic categories that include verbs of more than one type sometimes have hybrid characteristics, i.e. morphological properties associated with two different verb types. Most of these hybrids present a mix between body-anchored and agreeing verb forms, although I also attested a couple of verb forms that appear to be hybrids of neutral and agreeing verbs. Hybrids of body-anchored and neutral verb forms were not attested in the data. The reason seems to be phonological: body-anchored verbs can only be articulated on the body, while neutral verbs can generally be articulated anywhere but the body. This finding provides support for the idea that verb semantics affects verb type, and it also shows that the boundaries between different verb classes are not rigid – which again speaks in favor of a unified analysis.

As for spatial verbs, the most significant finding is that the restrictions on locus alignment and subject drop appear considerably looser than with agreeing verbs. This led me to conclude that spatial verbs do not participate in Agree in DGS – even when a form happens to align with a referent locus. Rather, I proposed that these verbs involve a demonstration component, loosening grammatical restrictions that otherwise apply to the other verb types. Signers decide what aspects of a spatial event to demonstrate depending on what information they deem both necessary and sufficient within the context. As such, spatial verbs receive a truly different treatment from the other verb types; in fact, I showed that (some) spatial verbs are more akin to productive classifier predicates than to conventionalized lexical verbs.

Finally, let me point out that my analysis of verbs and verb classification in DGS shows some intriguing similarities to Keller's (1998), who also argues for a unified analysis of verb types in DGS, based on empirical data.² In brief, Keller (1998) argues that entities assigned a locus in space bear 'place' features (as opposed to my 'referent' features), and locus alignment of verbs is argued to be a form of pronominal affixation rather than verb agreement. Keller (1998) claims that verbs articulated on the body are phonologically restricted from acting as a host, while there is no such restriction for spatial verbs. Although the spirit of Keller's (1998) analysis is similar to mine, our theoretical implementations differ substantially.

Given that many properties of the verb classification system have been re-

²I should note that Keller (1998) focuses predominantly on locus assignment and verb agreement, and less so on other properties.

ported to be shared among sign languages, one might anticipate other sign languages to show similar behavior to DGS in this domain. In the next section, I consider the potential implications of this dissertation for the study of sign languages as a whole.

9.1.2 Implications for other sign languages

Although one should always practice caution when extrapolating sign-language specific conclusions to other sign languages, it is evident that there are considerable similarities across sign languages around the world with respect to verbs and verb classification. While the similarities may, to a certain extent, be explained by universal semantic tendencies in human language (see Section 9.1.3 for further discussion), it seems that in sign languages, iconicity is additionally partially responsible for this state-of-affairs.

Sign languages are known to display striking correspondences in terms of verb classification, as well as in the underlying semantics of verbs of different types (see e.g. Meir, 1998; Meir et al., 2007). In Chapter 3, I investigated the relation between verb semantics and verb type in DGS by employing a semantic map as a tool. An advantage of this method is that it allows for formulating predictions about the semantics of verbs of different types in other sign languages, as well. For instance, in a hypothetical sign language containing just a few agreeing verb forms, their collective semantic profile can be expected to be relatively narrow and encompass e.g. only interaction verbs. It would then be unexpected to find an agreeing verb form which denotes, say, a perception event in such a language. Conversely, in a sign language with relatively many agreeing verb forms, these forms are likely to be members of a variety of different yet related semantic categories. The semantic map also makes it possible to predict for any given sign language which kind of verbs are most likely to change type, even though it cannot predict the direction of change.

At the same time, the validity of the semantic map, which I showed to function as predicted for DGS verbs, can only truly be assessed if data from more sign languages are added to it. I consider this a promising avenue for future research – and all the more so since the semantic properties that I hypothesize affect sign language verb type also govern transitivity marking in spoken languages, thus pointing toward the centrality of these properties in language; see Section 9.1.3 for further discussion.

Related to the topic of verb semantics, with the use of iconic mappings (Taub, 2000, 2001), I showed for DGS that verbs of all types use similar kinds of iconically motivated handshapes (although there are differences in preference). The iconic mappings and the semantic map analyses combined led me to the conclusion that *verb type* – as distinguished based on the place of articulation and movement specifications of a sign – relates to *dimensions* of transitivity, while *handshape* is associated with *degree* of transitivity. Given that iconicity appears to play a mediating role in both cases, similar general patterns may be predicted to be found in other sign languages.

Another major outcome described for DGS which may be expected to hold more widely across sign language is that body-anchored verbs restrict subject drop to first-person referents only. I argued that this constraint is motivated by iconic body-anchoring, triggering an automatic first-person interpretation of a null subject. In fact, I attested the same pattern in a previous study on psych-verb constructions in Sign Language of the Netherlands (NGT) (Oomen, 2017), albeit with only a subset of body-anchored verbs and based on significantly less data.

Vadim Kimmelman, one of the collaborators in the project that this dissertation is a part of (see Chapter 1.5), has investigated subject-drop patterns in Russian Sign Language (RSL). The results are reported together with the DGS results discussed in this dissertation in Oomen and Kimmelman (2019). As it turns out, RSL shows the same behavior as DGS (as well as NGT): there is a strong dispreference for null non-first person subjects with body-anchored verbs. Moreover, and again as in DGS, null subjects of all persons are perfectly fine in constructions with neutral verbs, providing further support for the idea that there is something about body-anchored verbs specifically that leads to this behavior. Thus, there is good reason to expect that other sign languages display the same pattern; future research is necessary to find out whether this is borne out.

As discussed in the previous section, I concluded that DGS distinguishes three verb types that participate in agreement with their arguments, and one verb type which makes use of demonstration (in addition to classifier predicates). As such, one may wonder whether other sign languages adhere to the same classification. Each sign language needs to be investigated on an individual basis to determine whether this is the case, as there may be sign-language specific properties that could point toward different conclusions. Let us therefore consider which circumstances would argue for or against the same verb classification in another sign language.

Firstly, I showed for DGS that body-anchored verbs and neutral verbs should definitely not be collapsed into the single category of ‘plain verbs’. I expect this conclusion to hold across sign languages. In fact, other sign linguists appear to make the same assumption, even if only implicitly. The reason that this distinction is often not made explicit probably has to do with the fact that many studies have primarily focused on agreeing verbs, whereas plain verbs have been relatively understudied. Indeed, it is not always immediately clear which verbs are considered ‘plain’ in different studies, and on precisely what grounds.

The studies that have focused more intensively on verb types other than agreeing verbs tend to express views similar to mine. For instance, Costello (2015) and Lourenço (2018), who argue that neutral verbs (or ‘single-argument agreement verbs’) may express agreement with an argument through localization, distinguish these verbs from verbs with a fixed place of articulation on or near the body. On the whole, this perspective aligns with the one I advocate for DGS, with the exception that I have claimed that the difference between body-anchored and neutral verbs is not one between agreement vs. absence of agreement. Rather, I proposed it lies in the type of referent features associated with verbs of these two types, with body-anchored verbs being associated with an inherent speaker-referent feature and neutral verbs with non-inherent referent features whose values are dependent on those of their arguments. Whether or not the same analysis can be extended to other sign languages depends on (i) whether body-anchored verbs constrain subject drop to first-person subjects only, as in DGS, and (ii) whether neutral verbs display similar localization patterns as attested in DGS.

Based primarily on the characteristics of their path movement, I also concluded that agreeing verbs and spatial verbs are of distinct types. This claim is in line with e.g. Padden (1988, 1990), but in contradiction to e.g. Janis (1992) and de Quadros and Quer (2008). A key observation leading to my conclusion is that agreeing verbs in DGS virtually always agree, or are at least in congruence, with their arguments. In contrast, it has been reported in a number of other corpus studies on various sign languages that agreement marking is optional (see e.g. de Beuzeville et al., 2009; Fenlon et al., 2018; Legeland, 2016). Although it is a possibility that the difference in results may partially be explained by methodological differences (see Section 9.2 for discussion), let us assume here that it reflects a genuine difference in the optionality of agreement marking among sign languages. While in my view, the optionality of agreement marking in a sign language is not necessarily an argument against the presence of a grammatical agree-

ment marking system in sign languages (contra e.g. Schembri et al., 2018, but in line with e.g. Pfau et al., 2018), a high degree of optionality would make the distinction between agreeing and spatial verbs less pronounced.

As for spatial verbs, their properties have generally not been studied as thoroughly as those of agreeing verbs – although Padden (1990) makes a number of observations for ASL about the properties of the path movement which I also described for DGS – such that it is not quite clear in how far spatial verbs in other sign languages display similar properties as those in DGS. This holds in particular for the properties of the path movement and the (lack of) constraints on argument drop. Studying these properties in different sign languages may help to assess whether spatial verbs in these languages also involve demonstration, as I argued is the case in DGS. In general, the principle that applies is that the less constrained the behavior of spatial verbs in a language, the more compatible it is with a demonstration account.

9.1.3 Implications for language in general

Having considered the implications of the DGS results for sign languages in general, I consider in this section what the results may teach us about all human language. Overall, the research presented in this thesis shows that even properties of verbs that superficially look very different in signed vs. spoken languages have their foundation in underlying principles that are shared across modalities.³

This insight emerges particularly strongly from Chapter 3, in which the endeavor to semantically characterize different verb types in DGS was built on the premise that the semantic properties that govern verb type are the same as those that mediate transitivity marking in spoken languages. This hypothesis motivated the application of a semantic map to the DGS data that had previously been proposed to account for case-marking for transitivity (Malchukov, 2005). Given that this methodology yielded results that (i) are interpretable and (ii) respect the constraints of the semantic map, I concluded that verb type in sign language and case-frame selection in spoken language are indeed governed by the same sort of semantic properties. As such, the DGS data may be considered to provide independent support for the centrality of these notions in (all) human language – as Hopper and Thompson (1980), for instance, already argued for several decades

³For a comprehensive work providing ample examples in support of this point, see Sandler and Lillo-Martin (2006).

ago.⁴ More generally, the results provide insight into the strength and nature of the relation between lexical meaning and syntactic properties in this domain. On balance, it seems that the findings in Chapter 3, as well as in the individual chapters on the grammatical properties of different verb types, indicate that the predictive power of a verb's meaning in relation to its syntactic properties is quite strong, a view also advocated by e.g. Levin (1993), Levin and Rappaport Hovav (1991, 1995).

I also showed that some properties of the verb-type system in sign languages that have typically been regarded as non-canonical, upon closer inspection, actually behave quite regularly in DGS. Most significantly, I argued against the common perspective that only some types of verbs have agreement properties while others do not. Rather, I demonstrated that verbs of all types (excluding spatial verbs) agree with at least their subject, even if such agreement marking is not always expressed in the surface form of a verb. My proposal was primarily motivated by the observation that iconic body-anchoring puts a constraint on subject drop, which provides indirect support for an agreement analysis; for neutral verbs, I argued that agreement with the subject in transitive constructions is instantiated, but is not overtly realized because of phonological constraints.

A potential modality difference was discussed in Chapter 8.2.1.2, in which I argued that the type of feature involved in the agreement between verbs and their arguments is of a different nature than the person feature generally described for spoken languages.⁵ I claimed that the introduction of a 'referent' feature is necessary to account for the fact that sign languages may use space to assign unique loci to referents within a discourse. Thus, although this category functions more or less in the same way as the category person, there are subtle yet important differences in the feature-assignment mechanisms involved. Connected to this point, I argued that the discourse-dependent nature of the referent feature has as a consequence that all arguments must be specified with a referent feature. In contrast, regarding the category person in spoken languages, it is generally assumed that third-person referents are characterized by a lack of person features (Harley &

⁴I hasten to add that the strength of correlation between signed and spoken languages warrants further investigation; see Section 9.3.

⁵I should note again that, although it is theoretically possible that there are spoken languages that also assign referents unique 'identifiers' in each separate discourse, I do not know of such languages. If they do exist, it does not take away much from the overall perspective that the feature 'referent' has an essentially different nature than the feature 'person'; it would necessitate a revision of the idea that this constitutes a modality difference.

Ritter, 2002).

However, on the whole, I believe this dissertation shows that the modality-induced differences that appear to exist between signed and spoken languages do not prevent language-universal mechanisms from manifesting themselves – thus strengthening the case for a strong shared foundation to all human language.

9.2 Methodology – a reflection

This dissertation is the first to investigate verbs and verb classification in DGS primarily based on naturalistic corpus data rather than elicited or experimental data. This choice was motivated by the desire to get a better measure of the extent of variation attested within the verbal domain, as well as the frequency with which certain phenomena occur. I analyzed a set of over 1,000 annotated clauses from the DGS Corpus, which contain verbs representing meanings included in the ValPaL-list (Hartmann et al., 2013). This list was specifically designed to be representative of the verbal lexicon in language; taking this list as a point of departure was therefore expected to yield a varied set of DGS verbs in terms of their semantic and syntactic properties.

As discussed in Chapter 1.4, while both the use of corpus data and the use of the ValPaL-list have their merits, there are also potential drawbacks. The aim of this section is to reflect on where and how these methodological choices might have affected the outcomes of the investigation, and how potential issues may be avoided in future research.

Overall, the use of corpus data has proven to be an asset. Beyond it offering highly detailed descriptive results, analysis of the corpus data has yielded some unexpected notable results. For instance, the subtle subject-drop patterns with body-anchored verbs vs. other verb types may have gone unnoticed had only elicited data been used. Furthermore, the corpus data showed that agreement marking in agreeing verbs is the norm rather than the exception in DGS. This is a striking result, as agreement marking has been assumed by many, and for many different sign languages, to be optional (indeed, e.g. Pfau et al., 2018, make the same assumption in their analysis of verb agreement in DGS).

Previous corpus-based studies on Australian Sign Language (de Beuzeville et al., 2009), British Sign Language (BSL; Fenlon et al., 2018), and NGT (Legeland, 2016) clearly show that agreement marking of both the subject and the object is optional in these languages. Therefore, let us consider whether the differences

in the results, instead of reflecting a genuine difference between sign languages, could be explained by either methodological differences or diverging perspectives on what constitutes agreement marking.

Since Fenlon et al. (2018) present the most thorough analysis, I shall focus here on the methodology and definitions they employed in their study of BSL. Importantly, Fenlon et al. (2018) treat agreeing verb tokens that occur in citation form but nonetheless align with their arguments as ‘congruent’. This category corresponds to what I call ‘congruent-b’ tokens in my study of DGS. However, I distinguished an additional type of congruence, in which the verb’s place of articulation, which aligns with a referent locus, may have been influenced by the place of articulation of a preceding sign. Fenlon et al. (2018) are not explicit on this matter, but it seems that they would analyze such instances as agreeing tokens. If that is the case, then Fenlon et al. (2018) are somewhat more generous in what they qualify as agreement than I have been.

Yet, when agreeing and congruent cases are grouped together, the BSL results starkly differ from those for DGS, since they demonstrate that agreement marking is clearly optional in BSL: approximately 35% of tokens in their data are incongruent with their argument locus. Since Fenlon et al. (2018) appear to have maintained a similar definition of agreement marking to the one I employed, it seems that the discrepancy between the BSL and DGS results cannot be explained by different definitions of agreement marking.

Perhaps certain methodological choices could explain the difference. For instance, in my analysis, I excluded constructions with impersonal subjects from the DGS data set.⁶ Fenlon et al. (2018) do not discuss whether they included impersonal constructions in their analysis, but since they do not explicitly mention excluding them, it seems plausible that they form part of their data set. Perhaps, then, they annotated verbs in constructions with impersonal subjects as incongruent by default. Given that impersonal constructions are quite common, such a decision may have a fairly significant impact on the results.

Finally, Fenlon et al. (2018) show that what I call neutral verbs hardly ever localize in BSL. Although neutral verbs are also infrequently localized (i.e. displaced) in the DGS data, I argued that such verbs do not necessarily need to be dis-

⁶Also, recall from Chapter 8.3.5 that I argued that null impersonal arguments in DGS are automatically associated with the center of the signing space, which I consider to be a genuine referent locus. As such, I would have analyzed verbs articulated at this location as congruent, had I included these constructions in the analysis.

placed in order to express agreement: the arguments neutral verbs are expected to agree with are often of the inanimate kind, and I showed that these tend to be associated with the center of the signing space. I have argued that this location may function as a real referent locus, such that neutral verbs articulated at this same location are analyzed as congruent. Having said this, it turned out that neutral verbs nonetheless appear to express agreement somewhat less often than agreeing verbs do; see Chapter 8.3.4.

Let me conclude the discussion by emphasizing again that the different results in Fenlon et al. (2018) and in this dissertation may also demonstrate a genuine difference in the frequency of agreement marking. Systematic comparisons across sign languages, where the methodology used is consistently the same, may shed more light on this matter in the future.

Turning to another matter, one of the major drawbacks of using naturalistic corpus data for linguistic research is that it does not offer negative evidence, i.e. it cannot show which constructions are ungrammatical in a language. This especially becomes an issue when developing a syntactic analysis, since ungrammatical constructions should be ruled out by it.

Nonetheless, in Chapter 8.2, I presented a formal analysis of constructions with body-anchored, neutral, and agreeing verbs. In part, the account relied on frequency patterns in the corpus data that show that some phenomena (i.e. agreement marking with agreeing verbs) virtually always occur, while others (i.e. non-first person subject drop with body-anchored verbs) virtually never occur.

Verifying by means of elicited data that these observations reflect true grammatical constraints is indeed important to provide further support for the theoretical claims I have made based on the patterns I attested in the corpus data. Still, I would maintain that the patterns in the corpus data are striking enough to justify putting forward a theoretical proposal that attempts to account for them. Since the propositions on which the analysis is built are falsifiable, they can be put to the test again in future work, where experimental methods and grammaticality judgment tasks may provide the negative evidence that the corpus results are not able to offer.

A final methodological issue which merits further discussion concerns the matter of balance in the data set. Recall that I annotated verb forms according to whether they reflected verb meanings included in the ValPaL-list (Hartmann et al., 2013; Malchukov & Comrie, 2015). While this list is supposed to be representative of the verbal lexicon in language, it is not necessarily balanced. Inspection

of the list reveals that it includes fairly many verbs denoting events involving an experiencer, for instance. Indeed, the DGS data set included relatively many body-anchored verb forms, which frequently involve an experiencer.

For each verb form, I annotated no more than 50 tokens in the corpus data. However, many of the verb forms were attested in the data (much) less often than that (see Table A.1 in Appendix A). This also has an effect on balance in the data set, since verb forms that occur frequently in the data, such as the body-anchored forms THINK and SAY1, may disproportionately affect the results.

In some cases, the lack of balance did not pose a real issue. For instance, the semantic map analysis presented in Chapter 3, may just as easily have been based on dictionary data. The same holds for the iconic form-to-meaning mapping analyses of verb forms of different types presented in Chapters 4.2, 5.2, and 6.2.

However, in other cases, in particular where frequency was a factor in the analysis, it needs to be acknowledged that due caution should be exercised in evaluating the results I have reported in this dissertation. This holds, for instance, for the analyses of subject drop and agreement marking. Yet in both these cases, the corpus data revealed (almost) categorical patterns: subject drop freely occurs except in body-anchored verb constructions with a non-first person subject, and agreeing verbs virtually always mark agreement with two arguments. As such, we can feel relatively confident that adding or removing verb forms or verb tokens from the data set will not significantly affect the results.

Finally, it seems to me that constituent order is the principle topic addressed in this dissertation where a lack of balance in the data set may have skewed the results. For instance, some verb forms might be more likely to trigger or co-occur with certain phenomena (e.g. negation or role shift) which might in turn trigger or block movement processes. As such, a frequently occurring verb form of a particular type which, for certain reasons, has a clear preference for a particular constituent order could have a relatively significant impact on the overall results. Thus, the descriptions of the constituent order patterns with verbs of different types presented in 4.3.1, 5.3.1, and 6.3.1 should be interpreted with considerable caution. Indeed, I refrained from committing to particular underlying or surface word orders in the development of the theoretical account in Chapter 8.2, separately offering a number of suggestions which are more speculative in nature in Chapter 8.3.1. Yet, it is evident that further investigation is needed in this domain (but see Bross, 2018, for a detailed study on the ordering of functional categories in DGS, based on elicited data).

9.3 Future research topics

Throughout this chapter, I already suggested a number of potential avenues for future research. Here, I highlight several topics which I consider particularly worth investigating in future work on verbs and verb classification in sign languages.

Firstly, as mentioned previously, a valuable follow-up to the semantic-map analysis from Chapter 3 would be to add data from more sign languages to establish whether the map continues to work as predicted, or whether the organization of the semantic categories on the map has to be adapted in order to account for all included languages. In the latter case, the principle holds that the more substantial the changes, the weaker the support for the hypothesis that case-marking for transitivity in spoken languages and verb type in sign languages are governed by the same semantic properties.

It would be particularly interesting to include (very) young sign languages in the analysis, as these may represent an early stage in the process of expanding their inventory of agreeing verbs. Indeed, Meir et al. (2007) report that Al-Sayyid Bedouin Sign Language (ABSL) does not include any agreeing verbs.⁷ For Israeli Sign Language, the authors attested intergenerational differences: older signers do not make use of verb agreement, while younger signers do. Thus, one should be attentive to the possibility of intergenerational variation and change; this is a factor that would be good to take into account in future work.

Relating to the topic of intergenerational variation, the analyses in this thesis did not take into account whether metalinguistic factors, such as age, sex, or signing region, are correlated with any of the reported grammatical patterns and phenomena. This subject certainly merits more attention in future research. In general, as has been discussed in Chapter 1.3, very little is known about grammatical variation in DGS among different subgroups of users. While it has been observed before that there are clear lexical differences among variants of DGS (see Hillenmeyer & Tilmann, 2012; Macht & Steinbach, in press), only Macht (2016) has reported a grammatical difference in the preferred position of PAM for southern vs. other regions (also noted in passing by Steinbach, 2011). Thus, it is clear that there is much more work to be done in this domain. Constituent order preferences, as well as perhaps frequency of agreement marking (in particular with neutral verbs), may potentially be subject to sociolinguistic variation. On the other

⁷Interestingly, Meir et al. (2007) report that ABSL does have spatial verbs, depicting a trajectory of motion.

hand, grammatical properties for which I argued iconicity plays a role, such as the restriction on subject drop with body-anchored verbs, are expected to remain constant across regions, age groups, or sex.

Indeed, I have previously suggested that the constraint on non-first person subject drop with body-anchored verbs may be expected to apply more widely to other sign languages, showing that this is at least the case for NGT (Oomen, 2017) and RSL (Oomen & Kimmelman, 2019). It would be interesting to find out whether other sign languages display the same pattern; if there are any languages that do not, then further research is required to determine why the kind of structural iconicity I have argued for would be subject to variation. In relation to this matter, I speculated in Chapter 8.2.1.5 that the subject-drop constraint may only apply to body-anchored verbs that are iconically motivated. However, I could not investigate this hypothesis based on the available data, as almost all body-anchored verbs in the data set are iconic. I leave this question to future research.

Another topic which merits further study is the precise function of the center of the signing space. I have argued that this location serves as a potential R-locus for at least inanimate arguments and (null) impersonal subjects, which also means that verbs that are expected to agree with such arguments can be said to express agreement when they are articulated at this location. But it appears that non-specific or generic arguments may also be associated with the center of the signing space. Therefore, I hypothesized that this location is reserved for referents with low referentiality. Future research may delve deeper into this issue.

In Chapter 6, I showed that regular agreeing verbs and spatial verbs behave sufficiently differently to classify them as verbs of distinct types. In fact, I even argued that spatial verbs should be set apart from all other lexical verb types, for which I proposed a unified theoretical account. For spatial verbs, on the other hand, I put forward a separate analysis in Chapter 8.1 in terms of demonstration. However, since my data set only included six different spatial verb forms, and the primary focus of the theoretical analysis in Chapter 8 has been on the other verb types, additional research into the properties of spatial verbs would be welcome. It would also be interesting to learn more about any cross-linguistic differences in this domain; the results reported by de Quadros and Quer (2008) for Libras, for instance, seem to suggest that spatial verbs in this language display different morphosyntactic behavior than in DGS.

Finally, and connected to the previous point, although I argued that DGS has three lexical verb types (plus hybrids) involving grammatical agreement, and an-

other verb type involving demonstration, other sign languages may involve a different verb classification. Indeed, this needs to be established on a case-by-case basis following an in-depth and expansive analysis of the properties of verbs of different types, as I have presented here in this thesis for DGS. I hope that this work may serve as a useful guide as to what type of properties to look out for.

APPENDIX A

Verb meanings and lexical signs

Table A.1: Lexical signs per verb meaning; verb type; and frequency. The last column indicates number of tokens per lexical sign. The number enclosed in brackets indicates the number of additional tokens used as a nominal or adjective. These examples were excluded from further analysis. Gray shading indicates that different lexical forms denoting the same meaning are of different types.

#	Verb meaning	Lexical signs	Verb types	Freq.
1	ASK FOR	ASK-FOR	body-anchored	4 (-)
2	BE A HUNTER	BE-DEAF	body-anchored	37 (-)
3	BEAT	BEAT	agreeing	10 (4)
4	BE DRY	BE-DRY1	neutral	1 (-)
		BE-DRY2	neutral	1 (2)
		BE-DRY3	neutral	2 (-)
		BE-WET	neutral	2 (-)
5	BE HUNGRY	BE-HUNGRY	body-anchored	1 (-)
		BE-THIRSTY	body-anchored	1 (-)
6	BE SAD	BE-SAD1	body-anchored	8 (1)
		BE-SAD2	body-anchored	7 (-)
		BE-SAD3	body-anchored	9 (-)
		BE-HAPPY	body-anchored	20 (-)
7	BOIL	BOIL	neutral	10 (-)
8	BREAK	BREAK	neutral	10 (1)
9	BRING	BRING	agreeing-sp	20 (-)
10	BUILD	BUILD1	neutral	14 (5)
		BUILD2	neutral	2 (1)
11	BURN	BURN	neutral	5 (2)
12	COOK	COOK1	neutral	9 (2)
		COOK2	neutral	7 (-)
13	DIE	DIE1	neutral	40 (4)
		DIE2	body-anchored	9 (-)
		DIE3	body-anchored	1 (1)
14	DRESS	DRESS1	body-anchored	4 (1)
		DRESS2	body-anchored	1 (-)
		DRESS3	body-anchored	1 (-)
		DRESS4	body-anchored	3 (-)
15	EAT	EAT1	body-anchored	2 (10)

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Table A.1 – continued from previous page

#	Verb meaning	Lexical signs	Verb types	Freq.
		EAT2	body-anchored	12 (9)
		EAT3	body-anchored	- (1)
		DRINK	body-anchored	8 (16)
16	FEAR	FEAR1	body-anchored	6 (-)
		FEAR2	body-anchored	1 (-)
		FEAR3	body-anchored	2 (-)
17	FEEL COLD	FEEL-COLD	body-anchored	13 (-)
		FEEL-HOT	body-anchored	11 (1)
		FEEL-WARM	body-anchored	- (3)
18	FEEL PAIN	FEEL-PAIN	body-anchored	4 (-)
19	FOLLOW	FOLLOW	agreeing	15 (1)
20	GIVE	GIVE	agreeing	22 (3)
21	GO	GO1	agreeing-sp	53 (-)
		GO2	agreeing-sp	5 (-)
22	GRIND	GRIND	neutral	1 (-)
23	HEAR	HEAR1	body-anchored	13 (4)
		HEAR2	body-anchored	29 (2)
24	HELP	HELP1	agreeing	35 (19)
		HELP2	agreeing	4 (-)
25	HIDE	HIDE	neutral	4 (1)
26	HUG	HUG1	agreeing	3 (-)
		HUG2	body-anchored	6 (-)
27	KILL	KILL	agreeing	2 (-)
28	KNOW	KNOW1	body-anchored	53 (-)
		KNOW2	body-anchored	53 (-)
29	LAUGH	LAUGH1	body-anchored	4 (-)
		LAUGH2	body-anchored	5 (-)
		LAUGH3	body-anchored	1 (-)
30	LEAVE	LEAVE	agreeing-sp	34 (-)
31	LIKE	LIKE	body-anchored	30 (-)
		DISLIKE	body-anchored	8 (-)
32	LIVE	LIVE1	body-anchored	13 (7)
		LIVE2	body-anchored	4 (1)

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Table A.1 – continued from previous page

#	Verb meaning	Lexical signs	Verb types	Freq.
		LIVE3	neutral	7 (3)
33	LOOK AT	LOOK-AT1	body-anchored	32 (-)
		LOOK-AT2	agreeing	22 (-)
34	MEET	MEET1	neutral	25 (2)
		MEET2	neutral	12 (2)
35	NAME	NAME	body-anchored	9 (-)
36	PLAY	PLAY1	neutral	14 (7)
		PLAY2	neutral	15 (20)
37	POUR	POUR	neutral	2 (-)
38	RAIN	RAIN	neutral	8 (2)
		THUNDERSTORM	neutral	3 (-)
		HAIL	neutral	2 (-)
		WIND-BLOW	neutral	1 (3)
		SNOW	neutral	1 (-)
39	RUN	RUN1	body-anchored	14 (4)
		RUN2	body-anchored	15 (1)
40	SAY	SAY1	body-anchored	49 (1)
		SAY2	body-anchored	2 (-)
41	SCREAM	SCREAM	body-anchored	16 (-)
42	SEARCH FOR	SEARCH-FOR	body-anchored	20 (2)
43	SEE	SEE	agreeing	49 (1)
44	SEND	SEND1	agreeing-sp	10 (1)
		SEND2	agreeing	29 (-)
45	SHAVE	SHAVE1	body-anchored	1 (-)
		SHAVE2	body-anchored	1 (-)
46	SHOW	SHOW	agreeing	40 (3)
47	SING	SING1	neutral	1 (1)
		SING2	neutral	1 (-)
48	SIT	SIT	neutral	28 (6)
49	SMELL	SMELL1	agreeing	3 (-)
		SMELL2	body-anchored	1 (-)
50	STEAL	STEAL1	neutral	4 (1)

Continued on next page

Table A.1 – continued from previous page

#	Verb meaning	Lexical signs	Verb types	Freq.
		STEAL2	neutral	1 (-)
51	TAKE	TAKE1	agreeing	15 (2)
		TAKE2	agreeing	2 (-)
52	TALK	TALK	body-anchored	27 (2)
53	TEACH	TEACH	agreeing	32 (27)
54	TELL	TELL1	body-anchored	26 (-)
		TELL2	agreeing	15 (-)
		TELL3	agreeing	8 (-)
55	THINK	THINK	body-anchored	51 (1)
56	THROW	THROW	agreeing-sp	30 (2)
57	TOUCH	TOUCH	agreeing	3 (-)
58	WASH	WASH	neutral	5 (1)

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Summary in English

Iconicity as a mediator between verb semantics and morphosyntactic structure: A corpus-based study on verbs in German Sign Language

MANY sign languages around the world have verbs that may signal their arguments by making use of a particular spatial mechanism: the verb's path movement is adapted such that it begins and ends at locations in the signing space associated with the subject and object of the verb. This mechanism has often been analyzed as a form of grammatical agreement. However, the system also presents a number of non-canonical properties when compared to agreement in spoken languages, which has prompted a longstanding and intense debate over the status of agreement in languages in the manual-visual modality.

One of the most puzzling aspects of the sign language agreement system is that across sign languages, only a subset of verbs are found to agree in the manner just described, while many other verbs do not seem to be able to express agreement at all. Moreover, it has been claimed that verbs that do agree have a shared semantic core in denoting concepts that involve some sort of (physical or metaphorical) transfer. Indeed, it appears that iconicity, i.e. a resemblance between linguistic form and meaning, has some part to play in this, as the signed modality has considerably more potential to reflect aspects of meaning – such as a relation of transfer – in linguistic form than the spoken modality.

In this dissertation, I cast a fresh light onto this debate by presenting a comprehensive corpus-based investigation of verbs with different agreement properties in German Sign Language (DGS). I initially distinguish between three main verb types based on their phonological characteristics – which are crucially also connected to their agreement potential. The verb types I distinguish are (i) body-anchored verbs, which are articulated on or close to the signer's body, (ii) neutral verbs, which are articulated in the signing space in front of the signer but lack a path movement, and (iii) agreeing verbs, which are articulated in the signing space and possess a path movement which may be modified to align with two

locations in the signing space. Within the last group, I make a subdistinction between regular agreeing verbs and spatial verbs, which are both characterized by a path movement; however, the former are generally argued to agree with person (i.e. referents), while the latter are said to agree with locations. Throughout this work, I pay special attention to the potential role of iconicity in both the lexical forms of verbs as well as the syntactic structure of the constructions they appear in. The main research questions I address in this dissertation are:

- (i) What are the semantic and morphosyntactic properties of verbs of different types in DGS?
- (ii) Which semantic and morphosyntactic properties are shared among verbs of different types in DGS, and which are type-specific?
- (iii) What role does iconicity play in the lexical forms and the morphosyntactic behavior of verbs of different types in DGS?
- (iv) Do the overall results point toward a shared or distinct underlying syntactic structure of constructions with verbs of different types in DGS?

In **Chapter 1**, I delineate the scope of this dissertation, and I introduce the key concepts and issues that form the point of departure of this work. I also provide a snapshot overview of the history and current state-of-affairs in the field of sign linguistics and the study of DGS, in particular. This work is part of the NWO-funded project *Argument structure in three sign languages: typological and theoretical aspects*; I describe the general goals of this project before introducing the dissertation-specific goals to conclude the chapter.

Much of the research presented in this dissertation is based on an analysis of a set of 58 dialogues from the DGS Corpus (<https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>). These dialogues had been annotated with glosses for manual signs as well as translations by the DGS Corpus team in Hamburg prior to this study. For the purposes of the present investigation, I added numerous annotations with information about the grammatical properties of selected verbs and the constructions they appear in. The annotation procedure is described in detail in **Chapter 2**. I selected verb tokens for analysis depending on whether they denoted meanings represented in a list of 80 verb meanings that are representative of the verbal lexicon in language. This strategy was expected to yield a comprehensive picture of verbs and verbal behavior in DGS while restricting the amount

of annotations. In this chapter, I also describe the procedure for two data elicitation sessions with native signers of DGS to collect some additional data that the corpus data could not provide.

In **Chapter 3**, I start off the exploration of the properties of verbs in DGS by scrutinizing the semantic underpinnings of different verb types. The chapter builds on the intuition that there is a relation between verb type in sign languages and case marking in spoken languages. Indeed, given that they mark two arguments by means of modification of their path movement, prototypical agreeing verbs necessarily need to be at least transitive. I hypothesize in this chapter that the same semantic properties of events which have previously been shown to govern case-frame selection to mark transitivity in spoken languages also mediate sign language verb type. To test this prediction, I adopt a semantic map approach previously employed to make predictions about the relation between verb semantics and transitivity marking in spoken languages, and apply it to the DGS data. The results I subsequently describe in the chapter provide support for my hypothesis, as the DGS data conform to the predictions imposed by the semantic map.

The analysis in this chapter also yields a fine-grained semantic characterization of different verb types. Body-anchored verbs are shown to denote events involving some kind of experience, neutral verbs typically involve a highly patientive argument and as such tend to denote either prototypically transitive or prototypically intransitive events, while agreeing verbs typically denote a type of interaction between two event participants. Moreover, I discuss a number of verb forms which are phonological hybrids of two verb types; interestingly, the semantics of these forms also generally fit with the semantic profile of the verb types they are hybrids of. This observation provides a first indication that there are profound connections between the different verb types even if they superficially appear to be very different.

In the subsequent trilogy of comparably structured chapters, I narrow the focus to one verb type per chapter, providing an in-depth analysis of the formational and morphosyntactic properties of body-anchored, neutral, and agreeing verbs (including spatial verbs), respectively.

In **Chapter 4**, I show that body-anchored verbs typically involve an iconic body-to-body mapping in which the body of the signer maps onto the body of a referent. Iconically-motivated properties of the handshape used in a verb form may further enrich the interpretation of this mapping. A form with an instrument handshape, for instance, makes iconic reference to how an instrument performs

an action on the body, triggering a mapping between the body of the signer and the body of a patient-like referent. In contrast, when a form involves a handshape which makes reference to body parts of perception, such as eyes, the body of the signer may be associated with that of an experiencer. Thus, the iconic properties of body-anchored verbs are shown to represent information about the role of the body in relation to the external environment.

A crucial finding, which also plays an important role in subsequent chapters, is that the corpus data provide evidence that subjects may be dropped in constructions with body-anchored verbs – under the condition that they are first person. That is, I show that null subjects are virtually always first-person referents; for the few exceptions to this pattern, I am able to offer an explanation. Based on this finding, I hypothesize that iconically-motivated body-anchoring triggers an automatic first-person interpretation of a null subject. If that is the case, then other verb types are expected to behave differently in this regard.

Indeed, in **Chapter 5**, I show that neutral verbs, which are articulated in the signing space and resist a body-anchored articulation, allow subject drop of all persons. In an analysis of recurring iconic form-to-meaning mappings among neutral verb forms, I demonstrate that the place of articulation of a neutral verb may be associated with the location of a referent. Again, the handshape specification may offer iconic clues about the semantic role of this referent. When a handling handshape is employed, for instance, the referent represented by the place of articulation of the sign acquires a patientive interpretation as the object manipulated by the hand(s) of an animate referent.

I additionally show that neutral verbs may be displaced – or localized – such that they are not articulated at the center of the signing space, but rather toward the signer's left or right. However, there are restrictions on when such displacement may occur. Specifically, the corpus data provide evidence that neutral verbs may be localized to express agreement with an animate argument, but only when it is (i) the sole available argument in an intransitive construction, or (ii) the internal argument in a transitive construction. In transitive constructions with a (typically) animate subject and an inanimate object, on the other hand, the verb usually gets articulated at the center of the signing space. Moreover, I show that inanimate arguments are typically associated with the center of the signing space. Based on this observation, I argue that a neutral verb which takes an inanimate argument as an object, and which is also articulated at the center of the signing space, should be analyzed as expressing agreement. The corpus data also provide

support for the claim that neutral verbs, being phonologically constrained from expressing agreement with two arguments, express agreement with the internal argument in transitive constructions.

Rounding out the series of descriptive chapters is **Chapter 6**, which studies the properties of verbs characterized by a path movement. In this chapter, I also investigate whether the corpus data provide any motivation for making a distinction between regular agreeing verbs and spatial verbs. In terms of iconic form-to-meaning mappings, there does not appear to be a clear difference: with all verb forms, the path movement may be said to represent a direction. Handshape specifications, which once again vary across forms, may enrich this general mapping by iconically signalling the type of referents associated with the beginning and end points of the verbs' trajectory. However, there are also fairly many verb forms with abstract handshapes, in which case we are left with direction as the only clear iconically-motivated property.

When it comes to morphosyntactic properties, the differences are more pronounced: regular agreeing verbs and spatial verbs show distinct behavior in terms of constituent order, valency patterns, locus alignment, as well as subject-drop patterns. Most significantly, I show that agreeing verbs consistently express agreement by starting their trajectory at a locus associated with the subject and ending it at a locus associated with the object (or vice versa, in the case of 'backward' verbs). Spatial verbs, on the other hand, display striking variability with respect to where they begin and end their movement. While they can start or end at a locus associated with a referent, they may also mark a locus associated with a location without argumental status. Most frequently, however, spatial verbs simply seem to mark arbitrary locations, where the position relative to the signer conveys information about the direction of a referent. A movement from a location close to the signer to a location further away thus appears to signal that a referent moves from a place close by to a place far away. With regard to subject drop, null subjects occur with remarkable frequency with a number of spatial verb forms. With several other verb forms, null subjects are somewhat less common, yet the data show that it is perfectly grammatical to drop a subject while crucially also leaving it unmarked on the verb. In contrast, subject drop occurs less frequently overall with agreeing verbs, and when it does, the verb marks the dropped argument through locus alignment. As such, it can be said for these verbs that agreement marking licenses a null subject.

Chapter 7 presents a systematic comparison of the findings from the three

preceding chapters in order to pinpoint where the different verb types are alike and where they diverge. This chapter sets the stage for the formal analyses presented in the following chapter. The discussion further cements the independent status of spatial verbs in relation to regular agreeing verbs – as well as to the other verb types. Body-anchored, neutral, and regular agreeing verbs, on the other hand, are shown to display fundamental interrelations.

Chapter 8 – the capstone chapter of this dissertation – takes off with a theoretical proposal to account for the behavior of spatial verbs. I propose that these verbs involve a demonstration component which loosens the restrictions both on locus alignment and subject drop. In other words, demonstration of certain properties of the referent(s) involved in the denoted event ensures the recoverability of these referents – even in the absence of overt arguments or the overt marking of these arguments on the verb. As such, spatial verbs are somewhere in the middle between conventionalized lexical verbs and productive signs more akin to classifier predicates.

I subsequently propose a unified syntactic analysis of constructions with body-anchored, neutral, and agreeing verbs, couched within the framework of Generative Grammar. Based on the observation that body-anchored verbs constrain subject drop to first person only, I propose that these verbs are in an agreement relation with the subject. Body-anchored verbs are unique in comparison to other verb types as they are equipped with an inherent first-person referent feature, essentially a way to formalize the idea that these verbs are fixed first-person forms. In the case of a null subject, sharing of the first-person feature on the verb leads to a first-person interpretation by default.

A reflex of this approach is that a feature clash arises in constructions with a non-first person subject and a first-person body-anchored verb. I propose that this clash gets resolved by means of a semantic interpretable feature which is associated with the subject and which overrides syntactic features. This analysis is in line with analyses of a similar sort of mismatch problem attested in languages with a mixed gender system, where a nominal and a verb may show a mismatch in gender features.

The analyses of constructions with agreeing verbs and neutral verbs subsequently build on the account of body-anchored verb constructions. In contrast to the latter, neutral and agreeing verbs do not have an inherent feature associated with them, such that they do not force a particular interpretation when an argument is left non-overt. Both these verb types have the ability to agree with

two arguments rather than one, although neutral verbs may only express agreement with one argument due to a phonological restriction. Apart from these differences, the underlying structure of constructions with body-anchored, neutral, and agreeing verbs is the same.

As such, I present a novel solution to the issue I described at the beginning of this summary, namely that only a subset of verbs in sign languages show grammatical agreement. I claim that all lexical verbs, in fact, agree with their arguments in DGS. Since sign languages are known to display striking similarities in the general verb classification system, the account I have proposed may be expected to apply more widely. Still, individual sign languages should be investigated on a case-by-case basis to determine whether there are any cross-linguistic differences that could speak in favor of a different approach. The present dissertation may serve as a useful guide to the sort of properties to look out for.

Chapter 9 concludes the dissertation by expounding on what this work contributes to the study of DGS, of sign languages, and of language in general. I also reflect on methodological issues, in particular relating to the use of corpus data, before highlighting a number of topics connected to the central themes discussed in this book that I believe deserve further attention in future research.

Nederlandse samenvatting

Iconiciteit als mediator tussen de semantiek en morfosyntactische structuur van werkwoorden: Een corpusgebaseerd onderzoek naar werkwoorden in Duitse Gebarentaal

VEEL gebarentalen in de wereld hebben werkwoorden die hun argumenten kunnen aanduiden door middel van een specifiek ruimtelijk mechanisme: de beweging van het werkwoord kan worden aangepast zodat het respectievelijk begint en eindigt bij locaties in de gebarenruimte die zijn geassocieerd met het onderwerp en het lijdend voorwerp van het werkwoord. Dit mechanisme wordt vaak gezien als een vorm van grammaticale congruentie. Het bevat echter ook verschillende ongebruikelijke eigenschappen in vergelijking met congruentie in gesproken talen. Als gevolg hiervan is er in de literatuur nog altijd intensief debat terug te vinden over de status van congruentie in talen in de manueel-visuele modaliteit.

Een van de meest raadselachtige aspecten van het congruentiesysteem in gebarentalen is dat slechts een subset van werkwoorden kan congrueren op de hierboven beschreven manier, terwijl veel andere werkwoorden helemaal geen congruentie lijken te kunnen uitdrukken. Bovendien blijken werkwoorden die wel kunnen congrueren een gedeelde semantische kern te hebben: ze duiden concepten aan die een vorm van (fysieke of metaforische) transfer met zich meebrengen. Het lijkt erop dat iconiciteit hier een rol in speelt. We spreken van iconiciteit wanneer (een aspect van) de betekenis van een linguïstische vorm, bijvoorbeeld een woord, is gereflecteerd in diens vorm. In gesproken talen vinden we iconiciteit onder andere terug in onomatopoeïa zoals het woord 'koekoek', waarbij de vorm van het woord op iconische wijze verwijst naar het geluid dat een koekoek maakt. In de gebaarde modaliteit is er door het gebruik van handen en lichaam aanzienlijk meer potentie dan in de gesproken modaliteit om iconiciteit te benutten.

In deze dissertatie schijn ik nieuw licht op het debat omtrent werkwoordclassificatie door een corpusgebaseerde studie te presenteren van werkwoorden met verschillende grammaticale en semantische eigenschappen in Duitse Gebaren-

taal (DGS). Ik maak in eerste instantie onderscheid tussen drie primaire werkwoordtypen gebaseerd op hun fonologische eigenschappen, die in belangrijke mate ook gelinkt zijn aan hun congruentiepotentieel. De werkwoordtypen die ik onderscheid zijn (i) *body-anchored* (lichaamsverankerde) werkwoorden, die op of vlak bij het lichaam van de gebaarder gearticuleerd worden, (ii) *neutral* (neutrale) werkwoorden, die in de gebarenruimte voor de gebaarder gearticuleerd worden en geen padbeweging van de ene locatie naar de ander hebben, en (iii) *agreeing* (congruerende) werkwoorden, die in de gebarenruimte gebaard worden en een padbeweging hebben die zodanig gemodificeerd kan worden dat de begin- en eindpunten corresponderen met twee verschillende locaties in de gebarenruimte. Binnen die laatste groep maak ik nog een onderscheid tussen reguliere *agreeing* werkwoorden en *spatial* (ruimtelijke) werkwoorden. Beide soorten worden gekenmerkt door een padbeweging maar eerstgenoemden congrueren met persoon terwijl laatstgenoemden met locaties congrueren. In dit werk besteed ik speciaal aandacht aan de potentiële rol van iconiciteit in zowel de lexicale vorm van werkwoorden als de syntactische structuur van de constructies waarin ze voorkomen. De hoofdonderzoeksvragen die ik in deze dissertatie probeer te beantwoorden, zijn:

- (i) Wat zijn de semantische en morfosyntactische eigenschappen van de verschillende werkwoordtypen in DGS?
- (ii) Welke semantische en morfosyntactische eigenschappen worden gedeeld tussen werkwoorden van verschillende typen in DGS en welke zijn specifiek voor bepaalde typen?
- (iii) Wat voor rol speelt iconiciteit in de lexicale vorming en morfosyntactische gedragingen van de verschillende werkwoordtypen in DGS?
- (iv) Wijzen de algemene resultaten op een gedeelde of een afwijkende onderliggende syntactische structuur van constructies met verschillende werkwoordtypen in DGS?

In **Hoofdstuk 1** baken ik het domein van deze dissertatie af en introduceer ik de voornaamste concepten en taalwetenschappelijke kwesties die het vertrekpunt vormen van dit werk. Ik geef ook een beknopt overzicht van de geschiedenis en huidige stand van zaken op het gebied van gebarentaalwetenschap in het algemeen en de studie van DGS in het specifiek. Deze dissertatie maakt deel uit van het project *Argument structure in three sign languages: typological and theoretical*

aspects ('Argumentstructuur in drie gebarentalen: typologische en theoretische aspecten'), gefinancierd door het NWO, waarvan ik de algemene doelen beschrijf alvorens ik inga op de dissertatie-specifieke doelen ter afronding van het hoofdstuk.

Een groot deel van het onderzoek is gebaseerd op een analyse van een set van 58 gefilmde dialogen tussen gebaarders van de Duitse Gebarentaal, afkomstig uit het DGS Corpus (<https://www.sign-lang.uni-hamburg.de/meinedgs/ling/>). Deze dialogen zijn door het DGS Corpus team in Hamburg eerder vertaald en van linguïstische annotaties voorzien. Voor de specifieke doeleinden van het huidige onderzoek, heb ik vervolgens vele nieuwe annotaties toegevoegd met informatie over grammaticale eigenschappen van werkwoorden en de constructies waarin ze voorkomen. De annotatieprocedure wordt in detail beschreven in **Hoofdstuk 2**. Ik heb werkwoorden geselecteerd voor analyse op basis van het criterium dat ze betekenissen hebben die overeenkomen met één van de 80 werkwoordbetekenissen uit een lijst die representatief wordt geacht voor het werkwoordlexicon in taal. Deze methode maakte het mogelijk het aantal annotaties te beperken maar toch een veelomvattend beeld te kunnen krijgen van werkwoorden en diens eigenschappen in DGS. In dit hoofdstuk beschrijf ik ook de procedure voor twee data-elicitiesessies die ik heb uitgevoerd in Göttingen, Duitsland, met twee moedertaalgebaarders van DGS. Deze sessies hadden als doel om aanvullende data te verzamelen die de corpusdata niet konden verstrekken.

In **Hoofdstuk 3** start ik met een ontdekkingsstocht naar de semantische grondslag van de verschillende werkwoordtypen in DGS. Ik begin met de intuïtie dat er een relatie is tussen werkwoordtypen in gebarentalen en de markering van transitiviteit in gesproken taal door middel van naamvallen.¹ Aangezien prototypische *agreeing* werkwoorden per definitie twee argumenten markeren, t.w. het onderwerp en het lijdend voorwerp, zijn deze werkwoorden altijd ten minste transitief. Ik onderzoek in dit hoofdstuk de hypothese dat bepaalde semantische eigenschappen van *events*, waarvan bekend is dat ze in gesproken talen invloed hebben op de selectie van naamvallen ter markering van transitiviteit, ook van voorspellende waarde zijn voor werkwoordtypes in gebarentalen. Om deze voorspelling te testen, pas ik een zogenoemde *semantic map* toe op de DGS-data. Deze *map* is eerder in onderzoek naar gesproken talen gebruikt om voor-

¹In Duitse zinnen met een hoogtransitief werkwoord als *brechen* ('breken'), bijvoorbeeld, staat het onderwerp in de nominatief en het lijdend voorwerp in de accusatief, terwijl je bij minder transitieve werkwoorden eerder andere naamvallen kunt tegenkomen.

spellingen te formuleren over de relatie tussen de semantiek en de transitiviteit van werkwoorden.

De resultaten die ik vervolgens voor DGS beschrijf, ondersteunen mijn hypothese: de DGS-data conformeren met de voorspellingen die de *semantic map* oplegt. De analyse in dit hoofdstuk levert daarnaast een precieze semantische karakterisering op van de verschillende werkwoordtypen. *Body-anchored* werkwoorden blijken vaak een ervaring of een belevenis van een mens of dier uit te drukken, zoals het ervaren van een emotie ('bang zijn') of een sensatie ('pijn voelen'). *Neutral* werkwoorden duiden vaak een prototypisch transitief of juist prototypisch intransitief *event* aan waarbij ten minste een uiterst patiëntieve referent, d.w.z. een entiteit die iets passief ondergaat, betrokken is. Denk aan werkwoorden zoals 'koken' of 'doodgaan'. *Agreeing* werkwoorden refereren meestal naar een interactie tussen twee deelnemers in een *event*, zoals bij 'lesgeven' of 'helpen'. Ik bespreek bovendien een aantal werkwoordsvormen die fonologische 'hybriden' zijn tussen twee typen; interessant genoeg past de semantiek van dit soort hybriden vaak bij de beide semantische profielen van de werkwoordtypen waarvan ze een kruising zijn. Deze observatie is een eerste indicatie dat er diepgaande onderliggende connecties zijn tussen verschillende werkwoordtypen in DGS – zelfs als zij op oppervlakkig niveau bijzonder verschillend lijken te zijn.

In de trilogie van vergelijkbaar gestructureerde hoofdstukken die volgt, versmal ik de focus naar één werkwoordtype per hoofdstuk. Ik presenteer daarin analyses van de lexicale en morfosyntactische eigenschappen van respectievelijk *body-anchored*, *neutral* en *agreeing* werkwoorden (inclusief *spatial* werkwoorden).

In **Hoofdstuk 4** laat ik zien dat *body-anchored* werkwoorden doorgaans een iconische *body-to-body mapping* vertonen, waarbij het lichaam van de gebaarder dat van een specifieke referent representeert. Iconisch gemotiveerde eigenschappen van de handvorm die gebruikt wordt in een werkwoordsvorm, kunnen de interpretatie van deze *mapping* nog verder verrijken. Een werkwoord met een handvorm die iconisch refereert aan een instrument, bijvoorbeeld, geeft op iconische wijze weer hoe een instrument een actie op het lichaam verricht. Zo vindt er een *mapping* plaats tussen het lichaam van de gebaarder en het lichaam van een referent met typisch 'lijdende' eigenschappen. Echter, wanneer een werkwoord gearticuleerd wordt met een handvorm die refereert aan lichaamsdelen van perceptie, zoals de ogen, wordt het lichaam van de gebaarder geassocieerd met dat van een 'ervaarder'. Met andere woorden, de iconische eigenschappen van *body-*

anchored werkwoorden representeren informatie over de rol van het lichaam van een referent in relatie tot de externe omgeving.

Een cruciale bevinding, die ook een belangrijke rol speelt in latere hoofdstukken, is dat de corpusdata bewijs leveren dat in zinsconstructies met *body-anchored* werkwoorden het onderwerp kan worden weggelaten – maar alleen als het onderwerp in de eerste persoon is. In andere woorden, *null* (niet uitgesproken) onderwerpen refereren vrijwel altijd naar de eerste persoon. Gebaseerd op deze bevinding, stel ik de hypothese dat *body-anchoring* automatisch leidt tot de interpretatie van een *null* onderwerp als een eerstepersoonsonderwerp ('ik'). Als dat inderdaad zo is, dan is de verwachting dat constructies met andere werkwoordtypen zich in dit opzicht anders gedragen.

In lijn met deze voorspelling, toon ik in **Hoofdstuk 5** aan dat *neutral* werkwoorden, die gebaard worden in de gebarenruimte en geen articulatie op het lichaam toestaan, wel voorkomen met alle soorten *null* onderwerpen – ongeacht persoon. In een analyse van veelvoorkomende iconische *mappings* tussen vorm en betekenis van dit type werkwoorden, laat ik vervolgens zien dat de plaats van articulatie van een *neutral* werkwoord geassocieerd kan worden met de locatie van een referent of object. Handvormspecificaties kunnen bovendien iconische aanwijzingen geven over de semantische rol van deze entiteit. Een hanteerhandvorm, bijvoorbeeld, refereert aan een 'lijdend' object dat gemanipuleerd wordt door menselijke handen.

Ik laat ook zien dat *neutral* werkwoorden verplaatst kunnen worden, waardoor ze niet meer in het midden van de gebarenruimte gearticuleerd worden maar eerder richting de linker- of rechterzijde van de gebaarder. In vaktermen wordt dit localisatie genoemd. Er zijn echter restricties met betrekking tot wanneer zo'n verplaatsing wordt toegestaan. De corpusdata tonen aan dat *neutral* werkwoorden in DGS gelocaliseerd kunnen worden om te congrueren met de locus van een zogeheten beziend (menselijk of dierlijk) argument, maar alleen wanneer dit argument (i) het enig beschikbare argument is, zoals in een intransitieve constructie, of (ii) het 'lijdende' argument is in een transitieve constructie. In transitieve constructies met een beziend onderwerp en een onbeziend lijdend voorwerp, daarentegen, wordt het werkwoord doorgaans gearticuleerd in het centrum van de gebarenruimte. Echter, onbezielde argumenten worden typisch gezien óók in het centrum van de gebarenruimte gebaard. Gebaseerd op deze observatie beargumenteer ik dat een *neutral* werkwoord, gearticuleerd in het centrum van de gebarenruimte, geanalyseerd moet worden als congruerend wan-

neer het lijdend voorwerp ook in het centrum van de gebarenruimte wordt gebaard. Omdat *neutral* werkwoorden fonologisch gezien maar met één argument congruentie kunnen uitdrukken, zijn ze vervolgens niet meer vrij om ook nog te congrueren met het externe argument in transitieve constructies.

Hoofdstuk 6 sluit de serie van beschrijvende hoofdstukken af met een studie naar werkwoorden die gekenmerkt worden door een horizontale padbeweging. In dit hoofdstuk onderzoek ik ook of de corpusdata evidentie verschaffen voor een onderscheid tussen reguliere *agreeing* werkwoorden en *spatial* werkwoorden. In termen van iconische *mappings* tussen vorm en betekenis lijkt er geen duidelijk verschil te zijn: de padbeweging in alle werkwoordsvormen kan worden geïnterpreteerd als de representatie van een richting. Handvormspecificaties kunnen deze algemene *mapping* verrijken door iconisch te signaleren wat voor soort referenten geassocieerd zijn met de begin- en eindpunten van de padbeweging. Er zijn echter ook tamelijk veel werkwoorden met abstracte handvormen, waarvoor alleen de representatie van een richting als een duidelijk iconisch gemotiveerde eigenschap geldt.

Als het aankomt op morfosyntactische eigenschappen, dan zijn de verschillen meer uitgesproken: reguliere *agreeing* en *spatial* werkwoorden laten onderscheidend gedrag zien op het gebied van o.a. woordvolgorde, locuscorrespondentie en combinatie met *null* onderwerpen. Het meest betekenisvolle verschil is dat *agreeing* werkwoorden consistent congruentie uitdrukken door te beginnen bij de locus geassocieerd met het onderwerp en te eindigen bij de locus geassocieerd met het lijdend voorwerp (of andersom, in het geval van zogeheten *backward* werkwoorden). *Spatial* werkwoorden vertonen juist opvallende variabiliteit in waar zij hun padbeweging beginnen en eindigen. Hoewel ze soms beginnen of eindigen bij een locus geassocieerd met een onderwerp of lijdend voorwerp, kunnen ze ook een locus markeren die is geassocieerd met een locatie. Maar het vaakst markeren *spatial* werkwoorden een ogenschijnlijk willekeurige locus, waar de positie ten opzichte van de gebaarder slechts informatie lijkt uit te drukken over de relatieve richting van een referent of voorwerp ten opzichte van de gebaarder.

Betreffende *null* onderwerpen valt te observeren dat deze bij een aantal *spatial* werkwoordsvormen opvallend vaak voorkomen. Bij sommige andere *spatial* vormen zijn *null* onderwerpen iets minder gewoon, al laten de data ook zien dat het volledig grammaticaal is om een onderwerp weg te laten, zelfs als het niet gemarkeerd wordt op het werkwoord door middel van congruentie. Dit in tegenstelling tot constructies met *agreeing* werkwoorden, waar het weglaten van onder-

werpen in het algemeen minder vaak voorkomt en – als het voorkomt – het onderwerp typisch gezien op het werkwoord gemarkeerd wordt.

Hoofdstuk 7 presenteert een systematische vergelijking van de resultaten in de drie voorgaande hoofdstukken, met als doel vast te stellen op welke punten de verschillende werkwoordtypen overeenkomen of afwijken. Dit hoofdstuk zet de toon voor de formele analyses die gepresenteerd worden in het volgende hoofdstuk. De discussie bekrachtigt de onafhankelijke status van *spatial* werkwoorden ten opzichte van zowel reguliere *agreeing* werkwoorden als de andere werkwoordtypen. *Body-anchored*, *neutral* en reguliere *agreeing* werkwoorden laten juist fundamentele overeenkomsten zien.

Hoofdstuk 8 – het sluitstuk van deze dissertatie – begint met een theoretisch voorstel om het gedrag van *spatial* werkwoorden te verklaren. Ik beargumenteer dat deze werkwoorden een demonstratiecomponent bevatten, die de restricties op zowel congruentiemarkering als het weglaten van onderwerpen doet verzwakken. In andere woorden, omdat *spatial* werkwoorden bepaalde eigenschappen van een of meerdere referenten demonstreren, kunnen deze referenten makkelijk geïdentificeerd worden en hoeft er niet expliciet naar ze gerefereerd te worden in de vorm van een argument of door middel van congruentiemarkering. Met deze analyse plaats ik *spatial* werkwoorden ergens in het midden tussen geconventionaliseerde lexicale werkwoorden en productieve gebaren die meer gelijk zijn aan klassificatorpredicaten.

Vervolgens zet ik een verenigde syntactische analyse van constructies met *body-anchored*, *neutral* en *agreeing* werkwoorden uiteen, ingebed in het theoretisch kader van de Generatieve Grammatica. Gebaseerd op de observatie dat *body-anchored* werkwoorden uitsluitend het weglaten van een eerstpersoons-onderwerp toestaan, beargumenteer ik dat deze werkwoorden – net als de andere werkwoordtypen – óók congrueren met hun onderwerp. Wat *body-anchored* werkwoorden uniek maakt, is dat ze met een inherent eerstpersoonsfeature uitgerust zijn. Dit feature is een formalisatie van het idee dat *body-anchored* werkwoorden in feite eerstpersoonsvormen zijn. In het geval van een *null* onderwerp legt het werkwoord daarom een standaard eerstpersoonsinterpretatie op van dit onderwerp, wat gebeurt door middel van *feature sharing*.

Een gevolg van deze benadering is dat er een featureconflict ontstaat in constructies met een onderwerp in de tweede of derde persoon en een *body-anchored* werkwoord, dat standaard in de eerste persoon is. Dit conflict wordt opgelost door middel van een semantisch feature, geassocieerd met het onderwerp, wat

syntactische features overschrijft. Deze analyse vertoont parallellen met analyses van vergelijkbare *feature mismatches* in talen met een gemengd genussysteem, waarin bijvoorbeeld een zelfstandig naamwoord en een werkwoord divergerende genusfeatures kunnen hebben.

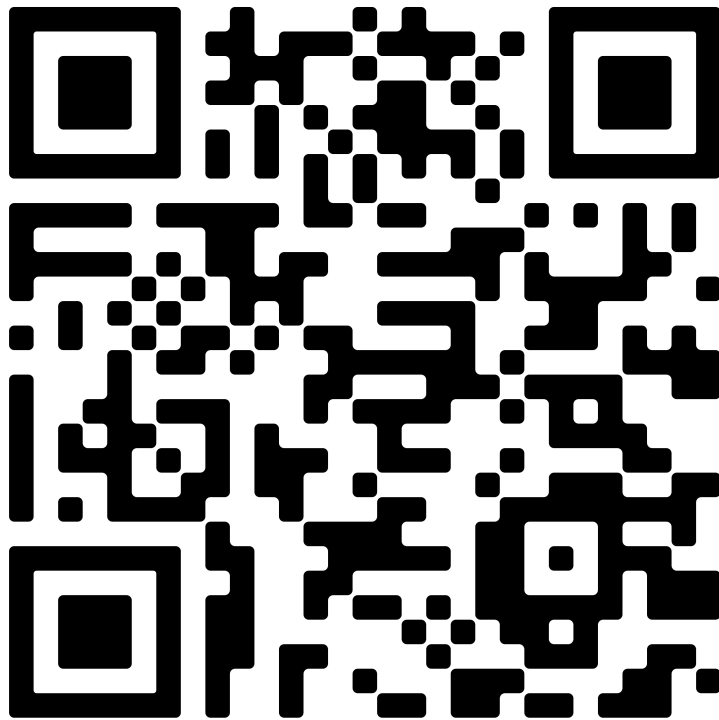
De syntactische analyses van constructies met *agreeing* en *neutral* werkwoorden bouwen vervolgens voort op die van constructies met *body-anchored* werkwoorden. In tegenstelling tot laatstgenoemde categorie, hebben *agreeing* en *neutral* werkwoorden geen inherent feature, zodat zij niet een specifieke interpretatie van een *null* onderwerp (of lijdend voorwerp) forceren. Beide werkwoordtypen kunnen congrueren met twee argumenten, al kunnen *neutral* werkwoorden vanwege fonologische restricties slechts met één argument daadwerkelijk congruentie uitdrukken. Op deze verschillen na, is de onderliggende structuur van constructies met *body-anchored*, *agreeing* en *neutral* werkwoorden identiek.

Met deze theoretische analyse presenteer ik een vernieuwende oplossing voor het probleem dat ik aan het begin van deze samenvatting beschreef, namelijk dat slechts een subset van werkwoorden in gebarentalen grammaticale congruentie vertoont: ik stel dat in DGS alle lexicale werkwoorden met hun argumenten congrueren. Aangezien verschillende gebarentalen opvallend veel overeenkomsten vertonen in het algemene classificatiesysteem van werkwoorden, is de verwachting dat de analyse voor DGS breder toegepast kan worden. Het is belangrijk daarbij de kanttekening te plaatsen dat individuele gebarentalen stuk voor stuk onderzocht moeten worden om vast te stellen of er wellicht toch crosslinguïstische verschillen zijn die een andere aanpak motiveren. De huidige dissertatie kan daarbij als een nuttige gids dienen.

Hoofdstuk 9 sluit de dissertatie af met een uiteenzetting van wat het werk bijdraagt aan de studie van DGS, gebarentalen en taal in het algemeen. Ik reflecteer ook op mogelijke methodologische tekortkomingen, waarbij ik in het bijzonder aandacht besteed aan het gebruik van corpus data. Ter afsluiting vestig ik de aandacht op een aantal onderwerpen, gerelateerd aan de centrale thema's bediscussieerd in dit boek, waarvan ik vind dat ze meer aandacht verdienen in toekomstig onderzoek.

Summary in German Sign Language

To view the summary of this dissertation in German Sign Language, scan the QR-code below or go to <https://doi.org/10.21942/uva.11335712>



About the author

Marloes Oomen (Breda, the Netherlands, 1991) obtained her BA degree cum laude in Liberal Arts & Sciences, with a major in Linguistics and Cognitive Neuroscience, from University College Utrecht (UCU). It was at UCU that her interest in sign languages was first sparked, leading her to start learning Sign Language of the Netherlands and to apply for the research master programme Linguistics at the University of Amsterdam (UvA), which offers a specialization in sign linguistics. She graduated from the programme cum laude in 2015.

Marloes was subsequently offered the opportunity to continue her study of the linguistic structure of sign languages as a PhD student in the NWO-funded project *Argument structure in three sign languages: typological and theoretical aspects*, supervised by Roland Pfau, Enoch Aboh, and Vadim Kimmelman. During her time as a PhD student, Marloes spent ten weeks at Universität Hamburg, where she participated in an intensive daily German Sign Language course, and seven weeks at Institut Jean Nicod in Paris as a guest researcher. She presented her work at over 20 conferences and symposia in over 12 countries, taught courses and guest lectures at both UCU and UvA, and published five peer-reviewed academic papers in various journals, including *Linguistic Typology*, *Sign Language & Linguistics*, and *Glossa*.

Following the completion of her PhD project, Marloes has started working as a lecturer at the department of Linguistics at the UvA. She has recently been awarded a Niels Stensen Fellowship, which will allow her to continue her research on sign languages in collaboration with the sign language group at Institut Jean Nicod in Paris, starting in the fall of 2020.