DE GRUYTER
MOUTON

Marloes Oomen

ICONICITY AND VERB AGREEMENT

A CORPUS-BASED SYNTACTIC ANALYSIS OF GERMAN SIGN LANGUAGE

SIGN LANGUAGES AND DEAF COMMUNITIES

DE G
ISHARA PRESS
Ishara Press

Marloes Oomen
Iconicity and Verb Agreement

Sign Languages and Deaf Communities

Volume 15

Marloes Oomen

Iconicity and Verb Agreement

A Corpus-Based Syntactic Analysis of German Sign Language

DE GRUYTER MOUTON
ISHARA PRESS

ISBN 978-3-11-074274-9
e-ISBN (PDF) 978-3-11-074278-7
e-ISBN (EPUB) 978-3-11-074284-8
ISSN 2192-516X
e-ISSN 2192-5178

Library of Congress Control Number: 2021946902

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.dnb.de.

Printing and binding: CPI books GmbH, Leck

www.degruyter.com

Contents

Acknowledgments —— XI

Notation conventions —— XIII

List of sign languages —— XVII

Part I: **Background**

1 Introduction —— 3
1.1 Verbs and arguments in sign languages —— **4**
1.1.1 General properties of sign language structure —— **5**
1.1.2 Person marking —— **7**
1.1.3 Verb classification —— **8**
1.1.4 Agreement auxiliaries —— **13**
1.1.5 Null arguments —— **14**
1.1.6 Agent-backgrounding —— **16**
1.2 Iconicity —— **17**
1.3 German Sign Language —— **20**
1.4 The value of corpus-based research —— **22**
1.5 Goals —— **23**
1.6 How to read this book —— **24**

2 Methodology —— 27
2.1 The DGS Corpus —— **27**
2.2 The ValPaL list —— **30**
2.3 The annotation procedure —— **31**
2.3.1 Verb form —— **33**
2.3.2 Constituent order —— **34**
2.3.3 Verb type —— **39**
2.3.4 Agreement marking —— **41**
2.3.5 Subject properties —— **44**
2.3.6 Argument-structure alternations —— **44**
2.3.7 Comments —— **45**
2.4 Methodological challenges —— **45**
2.4.1 Determining clause boundaries —— **45**
2.4.2 Lexical verbs and classifier predicates —— **46**

2.4.3 Labeling constituents —— 47
2.4.4 Non-overt arguments and subject demotion —— 49
2.4.5 (Lack of) negative evidence —— 50
2.5 Data elicitation: informants and procedure —— 51
2.6 Summary —— 52

Part II: **Verb semantics and iconic mappings**

3 Verb types and semantic maps —— 57
3.1 Verb semantics, verb type, and transitivity —— 58
3.2 Some quantitative results —— 61
3.3 A semantic map approach —— 63
3.4 A semantic map for transitivity splits —— 65
3.5 DGS verbs on the semantic map —— 69
3.5.1 Procedure —— 70
3.5.2 Body-anchored verbs —— 71
3.5.3 Neutral verbs —— 76
3.5.4 Agreement verbs —— 78
3.5.5 Hybrid verbs —— 80
3.5.6 Summary —— 85
3.6 Discussion —— 85
3.7 Conclusion —— 88

4 Iconic mapping patterns —— 90
4.1 Iconic mappings —— 90
4.2 Methodological procedure —— 92
4.3 Body-anchored verb forms —— 95
4.3.1 I: Instrument —— 96
4.3.2 II: Hand(s): holding —— 97
4.3.3 III: Hand(s): moving —— 98
4.3.4 IV: Body part: external expression —— 100
4.3.5 V: Body part: perception —— 101
4.3.6 VI: Body part: internal experience —— 102
4.3.7 VII: No body-to-body mapping —— 103
4.4 Neutral verb forms —— 104
4.4.1 I: Instrument —— 104
4.4.2 II: Hand(s): holding —— 106
4.4.3 III: Body part/whole entity (human) —— 107
4.4.4 IV: Whole entity (object) —— 108

4.4.5 V: Iconic movement — 109
4.5 Agreement and spatial verb forms — 110
4.5.1 I: Hand(s): holding — 110
4.5.2 II: Hand(s): moving — 112
4.5.3 III: Body part: perception — 114
4.5.4 IV: Whole entity (human) — 115
4.5.5 V: Iconic movement — 116
4.6 Conclusion — 117

5 Synthesis: verb semantics — 119
5.1 Degree vs. dimension of transitivity — 119
5.2 Back to the semantic map — 120
5.2.1 Body-anchored verbs — 120
5.2.2 Neutral verbs — 122
5.2.3 Agreement and spatial verbs — 126
5.3 Conclusion — 128

Part III: Morphosyntactic properties of verb forms

6 Body-anchored verbs — 131
6.1 Background — 131
6.1.1 Body as subject — 132
6.1.2 Psych-verbs in NGT — 134
6.2 Constituent order patterns — 136
6.3 Valency patterns — 141
6.4 Subject-drop patterns — 146
6.5 Summary — 150

7 Neutral verbs — 151
7.1 Background — 151
7.1.1 Localization is not agreement — 151
7.1.2 Localization is agreement — 152
7.2 Constituent order patterns — 156
7.3 Valency patterns — 159
7.4 Localization properties — 166
7.4.1 Internal arguments and localization — 167
7.4.2 External arguments and localization — 178
7.5 Subject-drop patterns — 181
7.6 Summary — 183

8 Agreement verbs and spatial verbs —— 185
8.1 Background —— **185**
8.1.1 Different kinds of agreement verbs —— **186**
8.1.2 Theoretical approaches toward agreement verbs —— **189**
8.2 Constituent order patterns —— **196**
8.2.1 Agreement verbs —— **196**
8.2.2 Spatial verbs —— **199**
8.3 Valency patterns —— **201**
8.3.1 Agreement verbs —— **201**
8.3.2 Spatial verbs —— **203**
8.4 Agreement properties —— **204**
8.4.1 Agreement verbs —— **208**
8.4.2 Spatial verbs —— **211**
8.5 Subject-drop patterns —— **215**
8.5.1 Agreement verbs —— **215**
8.5.2 Spatial verbs —— **218**
8.6 Summary —— **219**

9 Synthesis: morphosyntactic properties —— 221
9.1 Presence and position of arguments —— **221**
9.2 Valency —— **226**
9.3 Locus alignment —— **226**
9.4 Subject drop —— **230**

Part IV: **Theoretical analysis and implications**

10 Spatial verbs are demonstration verbs —— 237
10.1 Properties of spatial verbs —— **238**
10.2 Spatial verbs are demonstration verbs —— **243**
10.3 A demonstration continuum —— **247**
10.4 Conclusion —— **249**

11 A unified analysis in terms of agreement —— 251
11.1 An agreement analysis of body-anchored verbs —— **252**
11.1.1 Toward an agreement analysis —— **252**
11.1.2 Person vs. referent —— **256**
11.1.3 Inherent and interpretable features —— **258**
11.1.4 Feature (mis)match —— **260**
11.1.5 Structural representations —— **263**

11.1.6 Transitive constructions with body-anchored verbs —— 266
11.1.7 Second person —— 267
11.1.8 Role shift —— 268
11.1.9 Interim conclusions —— 269
11.2 Accounting for agreement verbs —— 271
11.2.1 Backward verbs —— 273
11.2.2 From body-anchored to agreement verbs —— 274
11.3 Accounting for neutral verbs —— 275
11.4 Outstanding issues —— 278
11.4.1 Movement and constituent order —— 279
11.4.2 Person agreement marker —— 283
11.4.3 Object drop in body-anchored verb constructions —— 285
11.4.4 Optionality of the localization of neutral verbs —— 286
11.4.5 A note on impersonal constructions —— 288
11.5 Conclusions —— 291

12 Concluding remarks —— 294
12.1 Outcomes —— 294
12.1.1 German Sign Language —— 295
12.1.2 Implications for other sign languages —— 298
12.1.3 Implications for language in general —— 301
12.2 Methodology – a reflection —— 302
12.3 Future research topics —— 306

A Verb meanings and lexical signs —— 308

Bibliography —— 311

Index —— 326

Acknowledgments

This book is a revised version of my 2020 dissertation, for which I was awarded my PhD degree at the University of Amsterdam and which formed a part of the Free Competition research program with project number 360-70-520, financed by the Dutch Research Council (NWO). Many people have supported me on the way toward completing this work, and I wish to take the time to acknowledge the most important ones here.

Firstly, I am deeply grateful to my PhD supervisors Roland Pfau, Enoch Aboh, and Vadim Kimmelman for all the commenting, challenging, motivating, questioning, and mentoring they have done during – and since – the years of my PhD research. I additionally thank Vadim for the incredibly pleasant collaboration on the "subject-drop paper", a version of which appears in this book.

I wish to extend my thanks to Markus Steinbach and Annika Herrmann for encouraging me to submit this book for publication, and to the members of the editorial and production team for their assistance as I was preparing the manuscript.

Many thanks to the DGS Corpus team in Hamburg for welcoming me at their department for a 10-week research stay back in 2015, and to Stefan Goldschmidt and Simon Kollien for teaching me German Sign Language during that time. I am grateful, too, to language informants Jens-Michael Cramer and Thomas Finkbeiner at Georg-August-Universität for sharing their insights on DGS verbs with me during my visit to Göttingen in 2019. I would also like to thank the members of the Sign Language Group at Institut Jean Nicod, Paris, for hosting me for an inspiring research stay toward the end of my PhD trajectory.

At the University of Amsterdam, I would like to acknowledge my sign language colleagues, with whom I have shared so many memorable moments, work-related or otherwise. Many thanks Cindy, Marijke, Roland, Ulrika, Vadim, and Vanja for the wonderful and productive years.

Finally, my deepest thanks go to my family – my parents Carla and Ad, my sister Evelien and brother-in-law Wilco, and my partner Douwe – for their love, support, and silent bemusement each time I launch into an impossible-to-follow monologue on whatever my latest research project may be.

https://doi.org/10.1515/9783110742787-203

Notation conventions

Signs are represented in the form of English 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 an example or are necessary for the correct interpretation of the construction (e.g. in the case of a headshake for negation) are represented.

All conventions used in this book are listed on the next couple of pages. An example sentence illustrating some of the 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) $\overline{\text{INDEX}_a\ \text{SEE}}^{\text{hs}}$ \ REASON BE-SAD INDEX$_a$ PU
‘She didn’t see it because she was sad.’

https://doi.org/10.1515/9783110742787-204

Manual signs:

Gloss	Description
SIGN	Manual signs are glossed in small capital letters in the English word(s) most closely approximating their meaning.
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++	Reduplication of a sign, e.g. to express plurality, is indicated by a plus symbol. Each symbol represents a reduplication cycle.
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:'.
SIGN.......	Indicates that the final configuration of a sign is held while the other hand continues signing.
CL(X):XXX	Classifiers and classifier predicates are indicated with the gloss CL, followed by a handshape specification between brackets, e.g. (), and a description of the meaning of the classifier or classifier predicate.
INDEX$_x$	Pointing signs are represented by 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 two pointing signs within a single example, the first INDEX is followed by the subscript 'a' and the second by 'b'.
POSS$_x$	A possessive pronoun, signed with a -handshape and at the locus indicated by the subscript.
VERB$_x$	Verb whose place of articulation aligns with a locus in the signing space, associated with a referent or location, to express agreement. The subscript specifies the location according to the principles explained for INDEX$_x$ above. Occassionally, 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 a genuine expression of agreement.
VERB$_{x*}$	Verb with a place of articulation in the signing space that does not correspond to a location previously associated with a referent or location.
$_x$VERB$_y$	Verb that moves from one location to another. The subscripts specify the initial and final locations according to the principles explained for 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, e.g. to signal topicalization.

Non-manual elements:

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

List of sign languages

All sign languages mentioned in this book 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 (*Língua Brasileira de Sinais*)	Libras
British Sign Language	BSL
Catalan Sign Language (*Llengua de Signes Catalana*)	LSC
Danish Sign Language (*Dansk Tegnsprog*)	DTS
German Sign Language (*Deutsche Gebärdensprache*)	DGS
Hong Kong Sign Language	HKSL
Inuit Sign Language (*Inuit Uukturausingit*)	IUR
Israeli Sign Language	ISL
Italian Sign Language (*Lingua dei Segni Italiana*)	LIS
Japanese Sign Language (*Nihon Shuwa*)	NS
Kata Kolok	KK
New Zealand Sign Language	NZSL
Russian Sign Language	RSL
Sign Language of the Netherlands (*Nederlandse Gebarentaal*)	NGT
Spanish Sign Language (*Lengua de Signos Española*)	LSE
Swedish Sign Language	SSL
Turkish Sign Language (*Türk İşaret Dili*)	TİD

https://doi.org/10.1515/9783110742787-205

Part I: **Background**

1 Introduction

Almost all sign languages 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, and ends at the locus associated with the object. Verbs of this type are called agreement or indicating verbs, depending on one's theoretical approach, and will be referred to as 'agreement verbs' throughout this book. Many other verbs cannot be modified in this way: some have a fixed articulation on the body, while others are articulated in space but lack the path movement that characterizes agreement verbs. In addition, there are verbs – generally referred to as spatial verbs – which possess a path movement similar to agreement verbs but agree with locations instead of referents.

Interestingly, verb type membership is known to be at least partially semantically grounded. For instance, a verb denoting the meaning 'answer' is a good candidate for an agreement verb. An answering event involves two event participants and a form of (metaphorical) transfer between them; a path movement may fittingly represent such a relation. A verb denoting the meaning 'feel', 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 as described above has intrigued many sign linguists over the years, with agreement verbs in particular having received much attention. A number of key questions keep resurfacing: How come that only a subset of verbs can 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 agreement verbs mark their arguments, i.e. through modification of their path movement, be analyzed as proper grammatical agreement or not?

This book provides answers to all of these questions for one specific sign language, namely German Sign Language (DGS). While not being the first to attempt to do so, it differs from many others within this realm of research in devoting equal attention to every verb type. This approach eventually leads to an integrative theoretical analysis, couched within Generative Grammar, that accounts for the syntactic structure of constructions with different verb types in a single unified model. Only spatial verbs are shown to display behavior that is different to such a degree that it warrants an alternative analysis, which will be laid out in a separate chapter.

An important theme throughout this book is the interplay between iconicity (direct form-meaning correspondences) and lexicon and grammar. For instance, the

https://doi.org/10.1515/9783110742787-001

observation that the verb type system in sign languages is semantically grounded can be partially attributed to iconicity, an idea which is further developed in Part II of this book. As will be demonstrated in Part III and theoretically accounted for in Part IV of this monograph, iconicity effects may even reach all the way into the grammar of DGS. It is important to point out that such effects can be accounted for in formal terms without having to directly appeal to iconicity in the formal structure itself, and this is indeed a guiding principle for the theoretical analyses laid out in this book.

This chapter sets the stage for the rest of the book and is organized as follows. Section 1.1 introduces a number of relevant linguistic properties and concepts, in particular pertaining to the use and expression of verbs and their arguments in sign languages. The concept of iconicity is discussed separately in Section 1.2. Section 1.3 provides some background to the historical and sociolinguistic characteristics of German Sign Language, the language of study. The research reported on in this book is based primarily on the analysis of naturalistic corpus data; in Section 1.4, I discuss the advantages and limitations of such corpus-based research. The goals of the investigation are outlined in Section 1.5. Finally, Section 1.6 presents a how-to guide for reading this book.

1.1 Verbs and arguments in sign languages

Section 1.1.1 introduces a number of general properties of sign language structure (readers who are well-versed in the field of sign language linguistics may skip this section). Subsequent sections discuss person marking (Section 1.1.2), verb classification (Section 1.1.3), agreement auxiliaries (Section 1.1.4), null arguments (Section 1.1.5), and agent-backgrounding (Section 1.1.6).

First, a general remark. Although every sign language has its own grammatical structure, there are many properties that are shared or common across sign languages, and this also applies to the phenomena under discussion in this book. Some such similarities may reflect modality effects, but there are other possible explanations. For instance, shared linguistic properties that are also attested in abundance across spoken languages may represent genuine language universals. Another contributor to cross-linguistic similarity among sign languages is their relatively young age: there are no known sign languages older than 300 years (Woll, Sutton-Spence & Frances 2001), and many are much younger than that. Indeed, sign languages have been observed to display striking similarities to young creole languages, in particular in their course of development and acquisition (Fischer 1978; Gee & Goodhart 1988; Aronoff, Meir & Sandler 2005). There are also commonalities in language structure, such as in the prevalence of rich aspectual systems, the frequent lack of prepositions to introduce oblique case, and a general heavy reliance on prosodic cues for expressing particular syntactic relations (Fischer 1978; Gee & Goodhart 1988). Whenever there is a high degree of similarity across sign languages within a particular grammatical domain, it is important to establish what the root cause(s) of the commonalities are. An adequate explanation enables the formulation of cross-linguistically valid predictions and generalizations, and may help in identifying parameters along which individual sign languages may diverge. This book puts forward various such predictions for the domains of verb classification and verb agreement in sign languages.

1.1.1 General properties of sign language structure

The basic building blocks of signs were first described by Stokoe (1960/2005), in his seminal work on American Sign Language (ASL). Stokoe was the first to argue that signs are not holistic elements but are made up of smaller, contrastive, meaningless units – just like words in spoken languages. The parameters of handshape, location, and movement (or motion) identified by Stokoe are still conventionally recognized as the main phonological building blocks of signs.[1] Significantly, a change in specification for one of the 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 has been regarded as a key argument in favor of the view that sign languages are natural languages, as it demonstrates that sign languages involve duality of patterning (Hockett 1959).[2]

Sign languages do not just employ the hands to convey linguistic meaning: non-manuals, articulated by the face and body, are a crucial component of sign language utterances. Non-manuals can 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 book.

1 Some linguists (e.g. Battison 1978) have argued that hand orientation should be distinguished as a fourth major category; others subsume handshape and orientation under the single category 'hand configuration' (e.g. Sandler 1989; van der Hulst 1996; Sandler & Lillo-Martin 2006), or claim that orientation is derivable from a combination of handshape and location (e.g. Crasborn & van der Kooij 1997; Brentari 1998). Furthermore, some researchers (e.g. Brentari 1998) recognize non-manuals as an additional independent parameter.

2 It is worth noting, however, that true minimal pairs appear to be relatively difficult to find in sign languages (Brentari 1998: p. 4).

Firstly, non-manual components can be lexically specified, in which case 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 & 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 also distinguish the part-of-speech of a particular sign: many signs can function both as a verb or a noun, or a verb and an adjective, in which case a mouthed word from spoken language can disambiguate 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 can spread beyond the manual negator, on which it is probably lexically specified, over one or more additional signs in the sentence (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 in addition to the manual negator, if present (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. Liddell 1986; Dachkovsky 2008; Klomp 2019).

Role shift is another phenomenon involving non-manual markers that merits introduction here. 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 (Lillo-Martin 2012; Herrmann & Steinbach 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 those of the referent shifted into, and a change in the direction of eye gaze (Padden 1986; Herrmann & Steinbach 2012). 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; Napoli & Sutton-Spence 2014; Meir et al. 2017). Napoli & 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: 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, which tend to more 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 (Happ & Vorköper 2006; Keller 1998; Bross & Hole 2017; Pfau & Glück 2000; Steinbach & Herrmann 2013; Herrmann 2013), although Rathmann (2003) has argued that DGS does not have a fixed order. Topic constructions, where the surface order may diverge from the basic order, are also common in DGS (Herrmann 2013).

1.1.2 Person marking

Sign languages may use space to express both actual and metaphorical spatial relations. 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 an overview chapter). In this system, referents become associated with particular locations in space (R-loci), and usually remain associated with them for the duration of a discourse (Lillo-Martin & Meier 2011). There are several means to set up an R-locus, but the most straightforward strategy is to use a pointing sign to localize a (present or absent) referent. A DGS example, taken from Steinbach & Onea (2016: p. 413), is displayed in (1). The noun phrase NEW TEACHER is followed by a pointing sign which localizes the referent; this location is abstractly represented by the subscript ‘a’ in the glosses.[3]

(1) INDEX$_1$ 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

3 See Notation conventions for the glossing conventions used in this book.

place of articulation may differ depending on where their corresponding referents are localized within the context of a discourse. The latter also holds 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.[4] 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., Meier 1990; Hou & Meier 2018). Although I arrive at the same conclusion in Chapter 11, in the corpus examples displayed throughout this book, I will use the gloss INDEX$_2$ 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. Keller 1998; Costello 2015; 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 book. I refer the reader to Chapter 11.1.2, in particular, for further theoretical discussion.

1.1.3 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) agreement verbs, (ii) spatial verbs, and (iii) plain verbs. Since the morphosyntactic properties of the different verb types are discussed in detail in Chapters 6 to 8, I aim to keep the discussion in this section brief, merely introducing the basic properties and a number of key research questions that debates in the literature have centered on in this domain.

4 There 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 garnered by far the most research interest is that of agreement verbs. As the name suggests, these verbs can express what is commonly analyzed as agreement marking, which they do by using locations in the signing space.[5] As described in the previous section, referents are assigned R-loci,and these are utilized by agreement verbs to express agreement. Prototypical agreement verbs have a path movement from a place directly in front of the signer to a location further away in their citation form; when a verb token expresses agreement, this movement is modified such that the initial place of articulation corresponds to the locus of the subject, while the final place of articulation aligns with the object locus. An example of a modified agreement verb is shown in Figure 1.1.

Fig. 1.1: A token of the agreement 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 agreement verbs in that they also involve a path movement, but they display locative rather than person agreement. An example of a spatial verb is shown in Figure 1.2. Since the morphosyntactic mechanism that agreement and spatial verbs employ appears to be the same, much of the debate concerning these verb types has centered around the question of whether or not they should be considered separate verb classes or not (see e.g. Quadros & Quer 2008; Janis 1992; Kwok, Berk & Lillo-Martin 2020). Agreement verbs and spatial verbs are extensively discussed, compared and analyzed in Chapter 8.

Finally, plain verbs are verbs that cannot be spatially modified in the way described above, and they have therefore been claimed not to express agreement. Plain verbs tend to be body-anchored verbs, which resist modification due to their

5 As I discuss in further detail in Chapter 8.1, not everyone agrees that this mechanism constitutes agreement, with some suggesting that agreement verbs *indicate* rather than agree with their arguments. Linguists of the latter theoretical persuasion therefore tend to refer to agreement verbs as 'indicating verbs'.

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

fixed place of articulation on the body. Figure 1.3 presents an example of a body-anchored verb; Chapter 6 discusses verbs of this type.

Fig. 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 verbs that are articulated in the signing space but lack a path movement should be considered plain or not (see e.g. Padden 1990; Keller 1998; Costello 2015; Lourenço 2018). Figure 1.4 shows an example of what I will refer to as a 'neutral' verb, after its neutral place of articulation at the center of the signing space in citation form. For a number of sign languages, it has been claimed that (some) neutral verbs can be displaced to align with the R-locus of a referent, leading some (e.g. Fischer & Gough 1978; Bos 1993; Costello 2015; Lourenço 2018) to conclude that such verbs express agreement with a single argument. Others (e.g. Padden 1990; Keller 1998) have claimed that this type of localization is a form of pronominal cliticization or affixation rather than agreement. Chapter 7 discusses the properties of neutral verbs in detail.

Fig. 1.4: A token of the neutral verb STUDY, articulated near the center of the (horizontal) signing space; 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 a role in the matter. Meir (1998, 2002), for instance, has claimed that agreement verbs express concepts of transfer. However, others have pointed out in response that the notion of transfer, unless considered in the most abstract terms, is not applicable to *all* agreement verbs (e.g. Steinbach 2011; Costello 2015; Pfau, Salzmann & Steinbach 2018; Bos 2017).

Then there are verbs that do not neatly fall into one of the basic classes, but appear to be somewhere in between. For instance, many sign languages have verbs with a fixed initial place of articulation on the body but a modifiable final place of articulation which can align with an R-locus (Meir et al. 2007). Other verbs typically behave like spatial verbs yet may sometimes display behavior that is more characteristic of agreement verbs (Quadros & Quer 2008). And there are also so-called 'backward verbs', which are agreement 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). Each of these special verb types are addressed at various points in this book.

DGS is reported to have the same basic types of verbs as other sign languages (Keller 1998; Happ & Vorköper 2006). Keller (1998) has presented the most thorough investigation of verb classes in DGS to date, proposing that many verbs involve pronominal affixation, phonologically realized as locations in the signing space. This analysis does not only apply to neutral verbs, as others had previously suggested (e.g. Padden 1990), but also to agreement 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, because they are phonologically constrained from doing so.

Finally, let me also briefly discuss classifier predicates here. As 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. Indeed, I will argue in Chapter 10 that spatial verbs share some key characteristics with classifier predicates.

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 movement the classified entity makes in space (see e.g. Supalla 1986; Emmorey 2003; Zwitserlood 2012). Figure 1.5 presents several examples. Benedicto & Brentari (2004) have argued 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, including DGS (see e.g. Glück & Pfau 1998; Ferrara 2012; Pavlič 2016; de Lint 2018).[6]

(a) CL( ):GIVE **(b)** CL( ):CYCLE **(c)** CL( ):LIE-DOWN

Fig. 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.

6 However, Kimmelman, Pfau & Aboh (2019) and Kimmelman et al. (2019) report systematic exceptions to the patterns described by Benedicto & Brentari (2004) in a variety of sign languages, including DGS (Kimmelman et al. 2019).

1.1.4 Agreement auxiliaries

Many sign languages make use of one or several auxiliaries (see Steinbach & Pfau 2007; Sapountzaki 2012 for overviews), which – unlike auxiliaries in spoken languages – often do not encode tense, aspect, or modality but have as their sole purpose to express agreement. They tend to do so in the same way as agreement verbs, i.e. through modification of their path movement. Agreement auxiliaries are often observed to combine with plain verbs, as these cannot express agreement marking by themselves (Steinbach & Pfau 2007; Sapountzaki 2012), and they 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 that 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 these languages, the auxiliary is derived from the lexical verb GIVE.

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

(2) HANS$_a$ $_a$PAM$_b$ MARIE$_b$ LIKE [DGS]
‘Hans likes Marie.’

Rathmann (2003) argues that PAM can 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 claimed to be possible for PAM to combine with verbs that can themselves express agreement.

Since Rathmann (2003), other researchers have affirmed the status of PAM as an agreement auxiliary (see e.g. Steinbach & Pfau 2007; Steinbach 2011; Macht 2016; Pfau, Salzmann & Steinbach 2018). 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 is that PAM can still occur when the verb is nominalized, which would be unexpected if it were a genuine auxiliary.

As it turns out, very few clauses in the data set analyzed for this research include the auxiliary PAM, so its properties form only a minor topic in this book; still, Chapter 11.4.2 provides a brief discussion.

1.1.5 Null arguments

Many sign languages allow for null arguments, and varying descriptions and analyses of this phenomenon have appeared over the years (see e.g. Lillo-Martin 1986, 1991; Bahan et al. 2000; Neidle et al. 2000; Wulf et al. 2002; Koulidobrova 2017 for ASL; McKee et al. 2011 for Australian Sign Language (Auslan) and New Zealand Sign Language (NZSL); Glück & Pfau 1998 for DGS; Bos 1993 and Oomen 2017 for Sign Language of the Netherlands (NGT)). Here, I provide a brief overview of this body of work.[7]

Lillo-Martin (1986, 1991) argues that in ASL, null arguments in constructions with plain and agreement verbs can be variables bound by an empty topic. Additionally, agreement verbs (only) can license the empty category *pro* through agreement. The analysis is supported by syntactic facts such as that agreement verbs do not require a resumptive pronoun for a subject that is left-dislocated across a *wh*-island (3a) but plain verbs do (3b) (examples reproduced from Lillo-Martin 1986: pp. 424–425). Bos (1993) and Glück & Pfau (1998) have subsequently described similar patterns for NGT and DGS, respectively.

(3) a. $\overline{\text{MOTHER}_a}^{\text{re}}$ INDEX$_1$ DON'T-KNOW WHAT (INDEX$_a$) $_a$SEND$_1$ [ASL]
'My mother$_i$, I don't know what she$_i$ sent me.'

b. $\overline{\text{MOTHER}_a}^{\text{re}}$ INDEX$_1$ DON'T-KNOW WHAT *(INDEX$_a$) 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.[8] In other words, plain verbs are claimed to express

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

8 However, 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.

agreement exclusively by 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. For instance, constructed action or dialogue is reported to correlate with a dispreference for overt pronominal subjects.

McKee et al. (2011) report broadly overlapping results in their study of Auslan and NZSL, which is based on data acquired with 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 spatially agree 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 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 show that first-person subjects in clauses with psych-verbs are frequently null, whereas third-person null subjects hardly ever occur.[9] I then argue 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 book, most notably in Chapter 6.4 on body-anchored verbs, where I investigate whether the same restriction holds in DGS, and in Chapter 11.1, which presents a theoretical account of constructions with body-anchored verbs and other verb types.

9 Interestingly, Wulf et al. (2002) report results that appear to suggest the opposite pattern for ASL: first-person singular pronouns are most frequently, and third-person singular pronouns least frequently, expressed overtly. However, 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 do not appear to have been excluded from the data set. As such, the results can tell us little about how often a third-person referent is or is not expressed in clauses with plain verbs.

1.1.6 Agent-backgrounding

Agent-backgrounding is a relatively understudied area in sign language linguistics, although some notable exceptions include several studies on passives in ASL (Kegl 1990; Janzen, O'Dea & Shaffer 2001), 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 & Quer 2013; Barberà & Cabredo Hofherr 2017a,b), and the contributions to a recent special issue of *Sign Language & Linguistics*, edited by Barberà & Hofherr (2018), which includes research on referential impersonals in six different sign languages.

Grammatically, the backgrounding of an agent can be done through passivization or by making it non-referential. Passive constructions are valency-reducing operations, unlike impersonal constructions, which "have the appearance of regular, 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 & Hofherr (2018). Kegl (1990) reports that null subjects also commonly occur in constructions with agent demotion in ASL. She additionally notes that in constructions with an agreement 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, O'Dea & Shaffer (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 for DGS by Hansen (2007), 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, O'Dea & Shaffer (2001), Hansen (2007) claims that signers consistently shift into (or 'embody') the role of the patient whenever 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; Russian Sign Language (RSL), Kimmelman 2018b; Turkish Sign Language (TİD), Kelepir, Özkul & Özparlak 2018), and the use of decifient human pronouns such as ONE, SOMEONE, or OTHER (RSL, Kimmelman 2018a; Italian Sign Language, Mantovan & Geraci 2018; Hong Kong Sign Language (HKSL), Sze & 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 has since been described for TİD (Kelepir, Özkul & Özparlak 2018), while Sze & Tang (2018) report for HKSL that loci in the upper signing space are associated with low referentiality.

Constructions that involve agent-backgrounding are largely excluded from the analyses in this book, as a detailed investigation of the properties of these constructions falls outside the scope of this research. Nonetheless, in Chapter 11.4.5, I briefly come back to the 281 examples in the data set that contain impersonal subjects, as the theoretical account presented in that chapter has some implications for the analysis of this construction type.

1.2 Iconicity

The nature of the relation between linguistic form and meaning is a topic that has long intrigued linguists, philosophists, and psychologists alike. A particularly influential perspective in this domain was expressed by Saussure (1916), who – himself inspired by the work of 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*]".[10] 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

10 In 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.

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 "[...] onomatopoetic 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). As the received wisdom is that sign languages are natural languages, it clearly does not have to be the case that "human language is almost wholly arbitrary" (Hockett 1959: p. 34). The pervasiveness of iconicity in sign languages suggests that the purported arbitrary nature of human language may have been overemphasized – even if arbitrariness is certainly present in sign language lexicon and structure, too.

In recent years, iconicity and/or non-arbitrariness in language – both signed and spoken – have become increasingly popular research topics (see e.g. Perniss, Thompson & Vigliocco 2010; Dingemanse et al. 2015 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 a particular meaning (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).[11]

Across sign languages, various iconic strategies are frequently attested. For instance, a lot of signs involve handling, instrument, whole-entity, or body-part handshapes (see e.g. Taub 2012; Padden et al. 2013; Hwang et al. 2017). These handshape types are frequently attested in lexical nouns, verbs (see Chapter 4) and classifier predicates. The latter additionally involve an iconically motivated movement representing the trajectory of the entity represented by the handshape (Zwitserlood 2012).

Another iconic strategy that is commonly employed across sign languages is the systematic use of both hands in lexical signs denoting inherently plural concepts (Börstell, Lepic & Belsitzman 2016; Lepic et al. 2016). There are differ-

11 Sound 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 et al. 2014). Still, the point is that the relation between form and meaning is not completely arbitrary.

ent types of plurality that can be iconically conveyed in what Börstell, Lepic & Belsitzman (2016) refer to as '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 frequently two-handed signs, as are signs representing dual entities such as 'scissors' or 'glasses' (Börstell, Lepic & Belsitzman 2016).

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, be it in signed or spoken language, can affect syntax. Generally, functionalists appear to happily accept such a stance (see e.g. Haiman 1980, 1985; Dik 1989; Croft 2003; Givón 1979; Talmy 2000), while formalists, in particular those taking a Generative Grammar perspective, tend to feel more resistance toward this idea. This is not surprising, given that generativists usually consider language structure to be autonomous, reflected in the assumption that the human brain houses a dedicated language faculty. However, Newmeyer (1992: p. 790) 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 sign language research. Studies that take a formal approach to iconicity in language structure include Wilbur (2003), Benedicto & Brentari (2004), Rathmann (2005), Grose, Wilbur & Schalber (2007), Meir et al. (2007, 2013), Schlenker, Lamberton & Santoro (2013), Schlenker (2014), Davidson (2015), Aristodemo & Geraci (2018), Kuhn & Aristodemo (2017), and Oomen (2017); 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 in various places in this book – but one important aspect that most of these studies share is the assumption that certain iconic properties have formal status, e.g. in the shape of variables or features. As such, they can be accounted for with the usual tools from the standard formalist toolbox.

In this book, in particular in Chapter 11, I also argue that iconicity affects grammatical structure. The arguments leading up to this conclusion can be found interspersed among Chapters 3 to 9.

1.3 German Sign Language

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

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 2019). Macht (2016) and Bross (2018) describe some variation in the properties of the agreement auxiliary PAM (see Section 1.1.4 and Chapter 11.4.2), and Bross (2018) additionally reports some syntactic differences between southern and other varieties of DGS in the domains of negation and contrastive focus. Hillenmeyer & 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 2019 for overviews). As with other sign languages, a correlation can be witnessed between deaf schools and regional variants of DGS (Hillenmeyer & Tilmann 2012; Eichmann & Rosenstock 2014), although Eichmann & Rosenstock (2014) report that the differences are becoming less pronounced. Lexical variation is reported to be particularly common in signs for numbers, days of the week, months, colors and family names (Hillenmeyer & Tilmann 2012; König et al. 2012).

The data analyzed for this research represent 11 different regions in Germany (see Chapter 2.1). A detailed examination of regional variation falls outside the scope of this study; as such, it should be borne in mind that there is always a chance that 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 went in tandem with the development of deaf communities as 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'Epée (1712-1789) founded the first school for the deaf worldwide, practicing a teaching strategy in which spoken French was accompanied by signs. De l'Epée partially borrowed these signs from the deaf community that 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 education (sign + speech) in Germany has lagged behind that of other European countries. Nonetheless, since the 1980s, bilingual teaching methods have gained in popularity (Herrmann 2013). Several deaf schools have now started up bilingual programs, including schools in Hamburg and Berlin (Günther et al. 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 (Albreghs 1927).[12]

The linguistic study of DGS, carried out by both deaf and hearing 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 and large-scale corpus project, aimed at documenting the everyday language of deaf people in Germany, is in its thirteenth year at the time of writing. As previously mentioned, a subset of this corpus has been linguistically annotated and analyzed for the purposes and present study; in the next section, I describe the benefits and challenges of such corpus-based research.

12 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.

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.[13]

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 have to designed both to accurately reflect variation in a language and 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 experimental data. That is, corpus data are a reflection of language in actual use. Given that language users are known to generally be stricter in judgment than in naturalistic production (Labov 1975), corpus data serve as an ideal test bed for evaluating and further refining analyses 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

13 I 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 in the field.

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, Klomp & Oomen 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. Geraci et al. 2015; Oomen & Pfau 2017; Fenlon, Schembri & Cormier 2018; Klomp 2019, 2021), 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.[14] The research presented in this book, 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 (see Chapter 2.5).

1.5 Goals

The primary goal of this research is to investigate the verb classification system in DGS in both semantic and morphosyntactic terms. The verb types that are studied in this book are initially distinguished based on their phonological properties (see Chapter 2.3.3 for discussion) and then investigated for their linguistic behavior. 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?

14 I have previously used this approach; see Oomen (2017) as well as Oomen & Kimmelman (2019), an adaptation of which is presented in Chapter 11 of this book.

As discussed in Section 1.1.3, 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 great detail. Furthermore, the attention has overwhelmingly been directed to the class of agreement verbs in sign languages, while other verb types have been investigated much less intensively.

This research 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 meant to be representative of the verbal lexicon in all languages (ValPaL list; Hartmann, Haspelmath & Taylor 2013), which yielded a varied set of verb forms representing verbs of all types (see Chapter 2). In Parts II and III, various methods of analysis are applied to the data set, 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. All the different facets of the analysis are tied up neatly in the theoretical accounts laid out in Part IV, the concluding part of this book.

Throughout this book, 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.

1.6 How to read this book

The four parts of this book, and each of the chapters within them, can be largely read independently from one another, depending on one's particular interests.

Part I provides the background needed for a proper interpretation of the findings presented in subsequent Parts II, III, and IV. In this chapter, I have introduced the research questions and main concepts that are discussed in this book. The annotation procedure of the corpus data that were analyzed for the research, and some of the challenges that were encountered in the process, are described in detail in Chapter 2. This chapter is of value to readers who have a general interest in corpus-based sign languages research, or to anyone who wishes to learn more about the methodological decisions taken in the data annotation process. The chapter also describes the procedure for the elicitation sessions I conducted with two DGS signers to collect some supplementary data.

Part II of this book focuses on the lexical semantic and iconic properties of different verb types in DGS and may appeal to readers with an interest in verb semantics, be it in signed or spoken language. Chapter 3 reports on a semantic analysis of the verb forms included 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 agreement verbs, having the ability to mark two arguments, must necessarily be transitive. With the help of a semantic map that makes predictions about transitivity marking in spoken languages (Malchukov 2005), I investigate whether the results for DGS provide support for this hypothesis. Chapter 4 investigates systematic iconic form-to-meaning patterns in body-anchored, neutral, agreement and spatial verb forms. Multiple iconic mapping patterns, in particular involving motivated handshapes, are identified. While some verb types prefer certain iconic handshape patterns over others, many patterns are shown to recur across different types. Chapter 5, the concluding chapter of Part II, connects the findings from the previous two chapters by elaborating on the proposal that verb type represents *dimensions* of transitivity, while iconic handshape mappings represent *degrees* of transitivity.

Those looking to learn more about morphosyntactic properties of different verb types may turn their attention to Part III. Chapters 6, 7, and 8 form a trilogy of chapters that describe the properties of respectively body-anchored verbs, neutral verbs, and agreement plus spatial verbs. Each chapter is structured similarly and discusses morphosyntactic aspects including constituent order, valency patterns, agreement properties (if applicable), and subject-drop patterns. Chapter 9 concludes Part III with a direct comparison of the morphosyntactic properties of the verb types investigated in the preceding chapters.

The findings from the chapters in Part II and III collectively lay the foundation for the theoretical analyses presented in Part IV, the capstone section of this book. Although the analyses build on the descriptive and typological work presented in the preceding chapters, they can in principle be read independently from the rest of the book, if one so desires. In Chapter 10, I start with an analysis of spatial verbs, proposing that they contain a demonstration component which allows them to loosen some grammatical restrictions that other verb types must adhere to. As such, I argue that spatial verbs fall somewhere in between conventionalized lexical verbs and classifier predicates. In Chapter 11, I then present a unified syntactic analysis of body-anchored, neutral, and agreement verbs, arguing that all three verb types are in an agreement relation with their subject. Since this chapter is the only one to involve formal syntactic analysis couched within the generative tradition, the theoretical concepts and machinery that figure in this account are introduced there. Finally, Chapter 12 concludes the book, highlighting the main findings and offering 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.

2 Methodology

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 denoting meanings included in a list used previously in typological investigations of argument structure in spoken languages (Hartmann, Haspelmath & Taylor 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). Methodological challenges are discussed in Section 2.4. In addition to analyzing corpus data, I collected some supplementary 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 briefly 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 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 1,160 hours of footage with 330 deaf signers of DGS, participating in pairs, from thirteen different regions in Germany (Langer 2012). General 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). At the time of writing, some 50 hours of dialogues with basic transcriptions and annotations had been made accessible online via https://www.sign-lang.uni-hamburg.de/meinedgs/ling/. At the time the project was in the data-analysis phase, however, just 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 sideward

https://doi.org/10.1515/9783110742787-002

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] These 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 one-handed signs produced with the dominant hand, or 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 encompass several clauses.
– **Englische_Übersetzung_A/B**: English free translation of produced signing. Annotation units may encompass 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 transcription system (Hanke 2004) was 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

1 ELAN 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 & Wittenburg 2008).

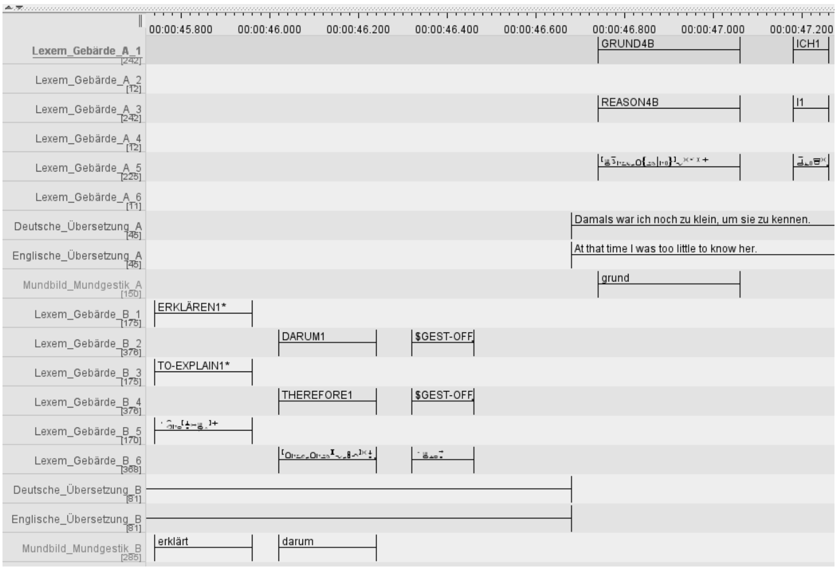


Fig. 2.1: A fragment of an annotation file in ELAN, with tiers and annotations created by the DGS Corpus Project team.

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 events, and more personal topics such as the signers' experiences in (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 pair 6 from the Hamburg region. Table 2.1c lists the abbreviations for each region. Copies of the files with my own annotations were saved and made available 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 files 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

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

(a)

Age	
18-30	19
31-45	33
46-60	32
61+	20

(b)

Sex	
Male	54
Female	50

(c)

Region		
Berlin	ber	6
Frankfurt	fr	12
Göttingen	goe	6
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

accessible by the DGS Corpus team at https://www.sign-lang.uni-hamburg.de/meinedgs/ling/.[2]

Throughout this book, examples from the DGS Corpus are labeled with a code such that they are searchable in the annotation files. 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

Constructions were selected in the corpus data based on a list of 80 verb meanings compiled by the Leipzig Valency Classes Project team (Hartmann, Haspelmath & Taylor 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 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 was to facilitate and carry out large-scale cross-linguistic comparison of valency classes, and data were collected for a representative sam-

2 Under the 'Transcript' tab, hover over the file names (e.g. dgskorpus_ber_01) to find the identifier codes.

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

ple of 36 languages; these data are compiled in an online open access database (http://www.valpal.info).[4]

Tab. 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

Since the ValPaL list is intended to consist of a representative set of verbs, the expectation was that using it would help gain a better understanding of the properties of verbs in DGS, while additionally facilitating future cross-linguistic comparison.

2.3 The annotation procedure

Signs representing verb meanings from the ValPaL list were identified in two steps. First, a systematic search was performed 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

4 An edited volume reports on findings for 30 of the languages (Malchukov & Comrie 2015).

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.

For each example, clause boundaries were determined (see Section 2.3.1 for a description of the procedure), which are reflected in the scope of each annotation. Annotations were then added across several tiers specifying information about the verb, its arguments, and other properties of the clause. Table 2.3 presents an overview of the annotation tiers; indentation in the first column indicates tier dependency.[5]

Tab. 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 agreement verbs: locus alignment with an argument at the verb's initial place of articulation.
AS-2-agreement	For agreement 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.

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).[6] The next subsections describe the annotation procedure for each tier in detail.

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

5 The annotation files include two additional tiers, labeled AS-class and AS-meaning, which provide information about classifier constructions in the data set. As this construction type is not discussed in this work, the annotation procedure for these tiers is not discussed any further.

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

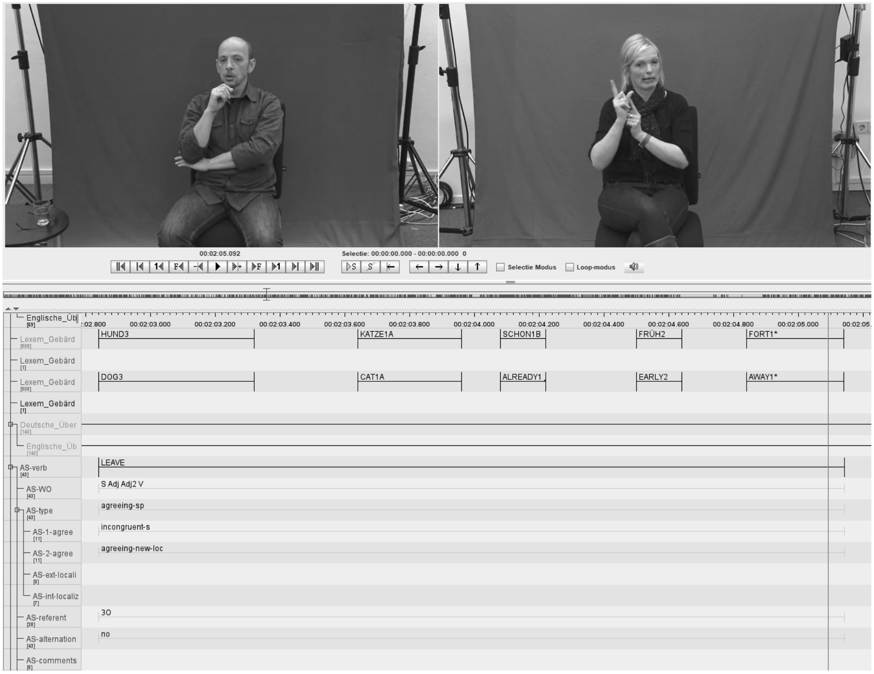


Fig. 2.2: ELAN screenshot of example (1).

2.3.1 Verb form

The first tier, named 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 consisting of two or more words were 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 were labeled CLASSIFIER. These tokens are excluded from the research reported on in this book and will not be further discussed.

The length of each 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 specific 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 similar 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 in the annotations 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 were 201 tokens of SEE in the data set, so every $201 / 50 \approx 4^{th}$ 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 Constituent order

The AS-WO (for 'word order') tier includes annotations representing constituent order. Dedicated labels indicate verbs and their arguments, but also other types of constituents. Specific symbols were used to signal role shift, embedding, and prosodic boundaries. Table 2.4 lists the inventory of labels and symbols. Labels were combined, separated by a space (e.g. 'S V Neg'), so as to reflect the constituent order of each of the examples. 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 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 INDEX$_a$ INDEX$_1$ **PLAY2**
'I used to play with the hearing kids.' [fra15-A-00:11.25]

Tab. 2.4: Syntactic labels on the constituent-order 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.
	O/Loc, O/Time, O/Instr, O/Goal	Adverbial constituent that semantically looks like an argument.
Modals and auxiliaries	Mod	Modal verb.
	Aux	Agreement auxiliary PAM.
	Aux-sp	Auxiliary borrowed from spoken German.
Other constituent types	Neg	Negative element.
	Conj	Conjunction.
	Perf	Perfective marker.
	Adj	(Other) adjuncts and adverbials.
	Part	(Discourse) particle.
Nouns and adjectives	N	Noun (phrase).
	A	Adjective.
Boundaries	\	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 included a series of two or more verbs or predicates that semantically appear to belong to the same clause. I distinguish between three types of such multiple-verb constructions. Firstly, in constructions with two independent verbs, the second verb was labeled V2 (the first verb is simply labeled V), with subsequent verbs annotated as V3, V4 etc. An example is given in (3).

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

Secondly, in serial constructions with two or more synonymous verbs, the second verb of the construction was labeled V' (and the third, if present, V"). For instance, SAY and TELL in example (4) were labeled V and V', respectively.

(4) $\overline{\text{GO1}}^{\text{re}}$ \ **SAY TELL1** INDEX$_a$ 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 was labeled V-comp (for ‘complex’). For instance, the classifier predicate CL( ):TAKEN-BY-HAND in example (5) has a patientive subject while the verb TAKE-ALONG takes an agentive subject (which is impersonal in (5)), but these two predicates together still describe a single event.

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

2.3.2.2 Arguments

Arguments were labeled, to the extent to which that was 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 semantically are recipients or goals were classified as indirect objects. Subordinate clauses that are not clausal objects, such as conditionals, were not included in the annotation unit and were 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 were labeled depending on which referent the context signaled as the most prominent (e.g. because it is the topic); this argument was labeled S/O. The other argument received the label O/S.

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

(6) INDEX$_1$ REGULAR $_1$**GO1**$_a$ AUSTRIA $_1$BACK-AND-FORTH++$_a$
‘We went to Austria over and over again.’ [hb06a-B-00:08.95]

Several 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, were labeled 'Mod' on the AS-WO tier.[7] 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 included exclusively negative forms of the modal ALLOWED.

WISH was annotated as a modal because the sign behaves like WANT and would best be translated as 'would like'. ALLOWED and NEED were classified as modals because they consistently co-occur with lexical verbs and also have negative forms.

The auxiliary conventionally referred to as PAM for 'person agreement marker' (Rathmann 2003) was labeled 'Aux'. For more information on PAM, see Chapter 1.1.4. A handful of tokens in the data set appeared to be auxiliaries borrowed from German or Sign Supported German. They were glossed as HAVE and WAS (i.e. past tense of 'be') by the DGS Corpus team; I labeled them 'Aux-sp' (for *sp*oken language).

2.3.2.4 Other types of constituents

While the focus of this research is on verbs and their arguments, all other constituent types were also labeled on the AS-WO tier, although the categories encompassing them were somewhat more broadly defined. The following labels were 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').
- **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 included more than one adjunct, then every n^{th} adjunct starting from the second one was labeled 'Adj*n*'.
- **Part**: For particles with discourse-related functions, such as PALM-UP (abbr. PU).

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

2.3.2.5 Nouns and adjectives

As previously mentioned, many verb meanings from the ValPaL list are expressed in DGS 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 functioned as a noun or adjective, I aligned the annotation unit with 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 was 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 occurred in compounds that appeared to have been created on the fly and which seemed to have been borrowed from spoken German. These compounds were typically accompanied by a mouthing, which did not always correspond to the cumulative of the individual meanings of the compound stems. Examples of this type were labeled 'N-mouth' or 'A-mouth' on the WO-tier. (7a) and (7b) present two examples.

(7) a. $\overline{\text{CLASS } \textbf{MEET1}}^{\text{'Klassentreffen'}}$
'Class reunion' (lit. 'class meeting'). [goe03-A-02:02.35]

b. $\overline{\textbf{SEARCH-FOR} \text{ BUNNY}}^{\text{'Versuchskaninchen'}}$
'Guinea pig' (lit. 'experiment [German *suchen* = 'search'] bunny'). [lei04-B-03:12.35]

2.3.2.6 Boundaries

Prosodic boundaries, for instance between a topicalized constituent and the rest of the sentence, were 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)

When role shift markers accompanied one or more signs in the clause, everything within the scope of the role shift was placed in square brackets in the annotation. Annotations for role shift were 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 were part of a dependent clause, the scope of the annotation included just this clause, and the annotation on the word order tier begins with a hashtag (#). When a target predicate was part of a matrix clause preceded or followed by an embedded clause, the embedded clause was labeled CO (for clausal object) on the WO-tier, but not included in the scope of the annotation. Dependent clauses that are not embedded, such as conditional clauses, were not labeled when the target sign was in the main clause.

2.3.3 Verb type

Annotations on the AS-type tier provide information about predicate type. This was 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

Verbs of types I, II and III are lexical predicates, while the classifier predicates of type IV (not discussed in this book) are not.

The categories above do not fully map onto Padden's (1988) traditional 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 were classified as body-anchored when they were articulated either on the body or close to it, in which case the place of articulation relative to the body had to be clearly be iconically motivated, as with SHAVE1 (Figure 2.3a). Following Oomen (2017), verb forms in which the hands represent hands or feet (Figure 2.3b) or limbs (Figure 2.3c), and with a fixed place of articulation directly in front of the signer, were also categorized as body-anchored forms. Body-anchored verbs are extensively discussed in Chapter 6.

(a) SHAVE1 (b) FEEL-COLD (c) FEAR2

Fig. 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. These verbs have the potential to be modified to align with the locus of a referent. Chapter 7 focuses on the properties of neutral verbs.

Verbs were classified as agreement verbs when they involved a path movement, which could have been modified to align with loci associated with referents or locations.[8] Verb meanings with a spatial semantics, such as LEAVE, were distinguished by the addition of the suffix '-sp'. There has been debate about the status of these verbs, with some treating them on a par with agreement verbs, and others analyzing them as a separate type (see e.g. Padden 1988; Janis 1992; Quadros & Quer 2008; Kwok, Berk & Lillo-Martin 2020). Chapter 8 discusses the properties of DGS agreement verbs, including spatial verbs, on the basis of which it is concluded in Chapter 10 that the distinction between these two verb types should be maintained.

8 In the literature, forms which do not have a path movement but allow modification of the orientation of the sign have been recognized as a subtype of agreement verbs (see e.g. Friedman 1975; Valli & Lucas 1992; Meir 1998). In the DGS data set, there were some forms (e.g. TEACH) that may involve orientation change and display a reduced, reduplicated, movement on the horizontal plane. Strictly speaking, such a movement might not classify as a canonical path movement, yet it can certainly be considered directional. There are no verbs in the DGS data that exclusively rely on orientation for agreement marking.

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

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

2.3.4 Agreement marking

On the four tiers for agreement marking, annotations give information about the modification properties of agreement, spatial and neutral verb tokens.[9] Neutral verbs have the potential to be localized in space to align with the place of articulation of one argument (e.g. Meir 1998), while agreement and spatial verbs may be modified such that their path movement starts at a locus associated with one referent (agreement) or location (spatial) and ends at a locus associated with another (e.g. Padden 1988; Lillo-Martin & Meier 2011). For the sake of simplicity, I will refer to both kinds of modification as ‘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 7.4 (neutral verbs) and 8.4 (agreement and spatial 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, where ‘ext’ and ’int’ stand for external and internal argument. Meir (1998) has argued for Israeli Sign Language that neutral verbs exclusively localize at the locus associated with their internal argument; in order to investigate whether the same pattern occurs in DGS, I evaluated whether the place of articulation of each neutral verb token aligned with the locus of the external and/or internal argument, if available. Normally, the distinction between external

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

and internal arguments is 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 (see Chapter 7.4 for further discussion). For intransitive constructions, an annotation was made on only one of the localization tiers, with the tier selected depending on whether the relevant argument was analyzed as external or internal. For transitive constructions, annotations were added on both tiers: one annotation for each argument. There were eight main annotation categories: (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 corresponding to a previously introduced referent locus, not at the center of the signing space. When a token introduced a new location in what appeared to be on-the-fly localization of a referent not yet overtly assigned a locus, the annotation label ‘localized-new’ was used.

‘Congruent’ neutral verbs are tokens which appear to have been localized localized but for which it is unclear whether this state-of-affairs also reflects the signer’s intentions. In some such cases, the argument with which the neutral verb seemed to align was articulated immediately preceding the verb, such that their shared place of articulation might also have been a phonological coincidence. These examples received the annotation value ‘congruent-a’. In other cases, both the argument and the verb were articulated at a neutral location in the center of the signing space, such that it is impossible to tell whether the neutral verb was genuinely localized or was actually used in its unmodified form. Tokens of this kind were labeled ‘congruent-b’.

‘Incongruent’ neutral verbs were articulated at a locus that clearly diverged from the locus with which the verb was expected to agree. ‘Unclear’ tokens are verbs which were articulated at the center of the signing space while the argument they were expected to agree with had not been localized at all. The label ‘default1st’ was used in the case of a first-person argument, since no localization was 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 at the center of the signing space, received the label ‘default’.[10] Since weather verbs such as RAIN do not take an argument and as such cannot be expected to be localized at an argument locus, these verbs also received the annotation ‘default’.

10 For more on this topic, see Chapter 11.4.5.

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 were overtly realized as an argument, I simply used the annotation label 'congruent-b' to indicate that both the referent and the neutral verb were articulated at the center of the signing space. In (a few) other cases, the non-specific or generic entity was not overt. In those 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 was relatively large.

Finally, the annotation values of neutral verb tokens with clear plural marking, either 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, were followed by the suffix '-pl' (see Steinbach 2012 for an overview of strategies used in sign languages to mark plurality).

The agreement properties of agreement and spatial verbs at their initial and final place of articulation were 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 a few exceptions.

Firstly, when there was agreement between the initial/final locus of the verb and the argument it was expected to agree with, the annotation label 'agreeing(-new)' (instead of 'localized') was used. Secondly, backward verbs (see Chapter 8.1) are characterized by a reverse alignment pattern in terms of subject and object marking. To indicate this difference in the annotations, the suffixes ' -o' and '-s' were added to the annotations for these verbs on the AS-1-agreement and AS-2-agreement tiers, respectively. Thirdly, verbs with a spatial semantics do not necessarily agree with subjects or objects, as they might (also) agree with locations. The annotations for such verbs were always followed by one (or, in case of ambiguity, a combination of) the following suffixes: '-s', '-o', or '-loc' (for location). Fourth, some agreement verbs, such as TEACH, can be used both transitively and ditransitively. In the former case, it is the recipient/goal argument that is absent, but that is also the argument that agreement verbs would otherwise be expected to agree with. Such transitively used verb tokens turned out to consistently have their final place of articulation at the center of the signing space; I used the annotation label 'default' to signal such cases. Finally, a handful of verbs which were classified as agreement verbs by virtue of their capacity to mark object agreement, yet have a fixed initial or final (for backward verbs) body-anchored place of articulation. Instances of such verbs received the annotation 'body' on the relevant tier.

2.3.5 Subject properties

The AS-referent tier encodes properties of the subject referent. Each annotation combines specifications for four parameters, namely person, number, and overtness 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. into 1O, 1Nrs, or 3plO. In cases involving 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 1.1.1). 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.

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

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

2.3.6 Argument-structure alternations

On the AS-alternation tier, I made notes about intuitions or suspicions regarding possible argument structure changes or alternations the verb in the example could participate in. Possible annotation values are e.g. 'transitive-intransitive', 'reflexive', and 'impersonal', but also 'nominalization' or 'adjectivization'. Examples with one of the final three annotation values are excluded from the analyses presented in Chapters 6, 7, and 8.

2.3.7 Comments

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

2.4 Methodological challenges

As with any corpus study, annotating the data went not without its challenges. In this section, I discuss the most important issues that came up during the data annotation process.

2.4.1 Determining clause boundaries

Delineating clause boundaries in sign language data is not a straightforward matter. Conjunctions and complementizers are optional (Tang & Lau 2012; Fenlon 2010), 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 examples.[11] For each token, I determined which signs surrounding the verb semantically looked like arguments, and subsequently whether or not these potential arguments were separated from the verb by prosodic boundaries. When such boundaries were present, I made an assessment about whether they signaled a

11 Hansen & 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, can 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.

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 the investigation.

When there were other predicates close to the target verb, I assessed whether there was any semantic or prosodic indication that they combined into a type of multiple-verb construction. I evaluated whether the events denoted by these verbs involved the same participants, and whether there were any prosodic cues – such as a change in the direction of eye gaze, a pause, or a hold – to signal multiclausality. If not, I classified the example as a clause involving multiple verbs, and 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. Finally, in some cases, an argument was sandwiched in between two verbs, where it semantically could belong to either one. In such cases, I had to rely on prosodic cues to determine clause boundaries.

2.4.2 Lexical verbs and classifier predicates

Some verb meanings from the ValPaL list easily lend themselves to being expressed with classifier predicates. This particularly applies to 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 2.4). 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.

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 2.5), 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 SIT in Figure 2.4 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. As I was unaware of

Fig. 2.4: An instance of the lexical sign SIT.

Fig. 2.5: An instance of the classifier predicate CL( ):SIT-DOWN.

this difference at the start of the annotation process, this meant that I had to make a post-hoc judgment. In practice, this entails that the annotations on the AS-verb tier occasionally had to be changed to reflect this decision. The verb meanings BREAK (a classifier and a lexical sign) and BUILD (two lexical signs) went through the same process. In some cases, 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) and 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 rather 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 & Newport 1978 for American Sign Language; Johnston 1989, 2001 for Australian Sign Language; Kimmelman 2009 for Russian Sign Language (RSL)).[12] There are few tried-and-tested part-of-speech diagnostics, and those diagnostics that have been reported could be language-specific (Loos 2014). And in any case, syntactic tests cannot be applied to corpus data.

Various 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) 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) INDEX$_1$ **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.'[13] [ber04-B-07:10.25]
b. PEOPLE **DRINK** CL():POUR
'Those were the people who bartended [lit.: 'poured drinks'].'
[fra01a-B-01:20.00]

Thirdly, constituent order is known to be 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

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

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

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, the semantic context, sometimes in combination with prosodic cues, necessarily guided the labeling process (see Hansen & Heßmann 2007).

(10) a. $\overline{\textbf{KNOW1}\ \text{INDEX}_1}^{\text{hs}}$
'I just can't imagine [it].' [lei02-A-02:17.00]
b. $\overline{\textbf{KNOW1}\ \text{INDEX}_a}^{\text{hn}}$
'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 may be non-overt in DGS. An example with two null arguments is presented in (12).[14]

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

Examples like (12) need to be distinguished from examples that include impersonal subjects, such as the ones in (13). Clauses with impersonal subjects received the

14 Recall from Section 2.3.5 that null subjects receive the label 'N' on the AS-referent tier.

annotation '0' on the AS-referent tier to indicate that the subject was non-overt but that it was 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 again determined primarily based on the context, i.e. by determining whether any referents had been introduced in the context that might serve as arguments to the verb. In the case of agreement verbs and neutral verbs, lack of modification of the token turned out to be an additional cue to signal an impersonal subject. Impersonal constructions were excluded from the main analyses presented in this book, although Chapter 11.4.5 briefly discusses this construction type.

2.4.5 (Lack of) negative evidence

A limitation of corpus-based research is that it 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 the main interest is 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 were able to participate in particular argument-structure alternations, but they only occurred in constructions representing one half of the alternation in the corpus data. Secondly, for some verb types, the data did not clearly show what their modification properties were. Verbs that are articulated in the center of the signing space in their citation forms, called 'neutral verbs' in this book, 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 for these 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) the modification abilities of neutral verbs and spatial verbs. Both 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 family relations. Informant 1 indicated that the (signing) region he identifies most closely with and/or has spent the most time at, is Nordrhein-Westfalen, which is situated 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 lasted 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 that (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 included 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 such examples, with the form BE-DRY3, are represented in (14). Equivalents of the first but not the second construction type in (14) were attested in the corpus data; the aim was to verify whether the second (resultative) construction was judged to be grammatical by the signers.

(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.’

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 be likely to use the 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 about their interpretation of the sentence.

In part three of the elicitation session, I signed 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).[15] COOK1 is a verb that can be used both in intransitive (unspecified-object) constructions and regular transitive constructions. The sentences in (15a) and (15b) aimed to test whether COOK1 could be localized at the locus associated with the subject (as in (15b)) when the verb is used intransitively, or 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, 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 6 to 8, 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 discussed some of the challenges encountered along the way. In the data set, I identified and annotated clauses with verbs representing meanings from the ValPaL list (Hartmann, Haspelmath & Taylor 2013). The newly created annotations include information about constituent order, verb

15 The 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.

type, agreement, properties of the subject, and possible argument-structure alternations. 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.

Part II: **Verb semantics and iconic mappings**

3 Verb types and semantic maps

As discussed in Chapter 1.1.3, verbs in sign languages are commonly classified based on their agreement properties.[1] Typically, a distinction is made between agreement verbs and spatial verbs – which agree with person/location – and plain verbs – which do not agree (see e.g. Quadros 1999; Janis 1992; Meir 2002; Padden 1988).[2] It has additionally been suggested that this classification is semantically grounded: agreement verbs can be said 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 (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 previously been used to investigate transitivity in spoken languages to sign language data. This is what I set out to investigate.

I discuss the rationale behind the hypothesis in greater detail in Section 3.1 and then briefly discuss some quantitative results from the DGS corpus data in Section 3.2. Section 3.3 introduces the method, a semantic map approach. Then, in Section 3.4, a semantic map for transitivity splits (Malchukov 2005) is applied 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). Section 3.7 concludes the chapter.

1 A version of this chapter has been published as: Oomen, Marloes. 2018. Verb types and semantic maps. In Vadim Kimmelman & Helen Koulidobrova (eds.), *FEAST Proceedings*, vol. 2, 116–132.

2 Exceptions 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 et al. 2004; Meir et al. 2007) and Kata Kolok (Marsaja 2008; de Vos 2012), which do not possess agreement verbs.

https://doi.org/10.1515/9783110742787-003

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 transitivity in spoken languages. A fundamental insight leading to this hypothesis is that – as prototypical agreement verbs in sign languages are defined by their ability to agree with two arguments – they must necessarily denote events involving (at least) two participants. Indeed, (Meir 1998, 2002) claims that agreement verbs semantically express transfer, and this 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: p. 253).

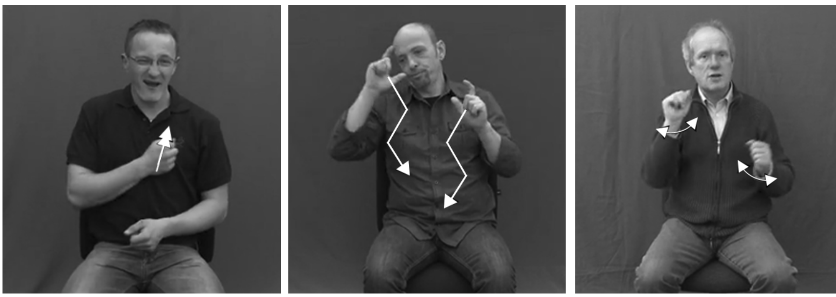
It is not a coincidence, of course, that agreement verbs tend to denote concepts involving transfer: the path movement that most agreement verbs possess appears to iconically represent such a relation. But a transfer relation is not the only semantic feature that can be expressed in an iconic manner; 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 6.1 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).[3]

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, 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.[4] While we may expect both intra- and

3 Figures 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 categorization procedure, I refer the reader back to the annotation guidelines described in Chapter 2.3.3.

4 In 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 can be 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.



(a) FEAR1 **(b)** FEAR2 **(c)** FEAR3

Fig. 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, transitivity is defined as a gradable and semantically multifactorial notion, following Hopper & Thompson (1980). That is, verbs denoting meanings 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 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. 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 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.[5]

adapted to align with that of the object. Other hybrid forms found in the corpus data are discussed in Section 3.5.5.

5 With 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.

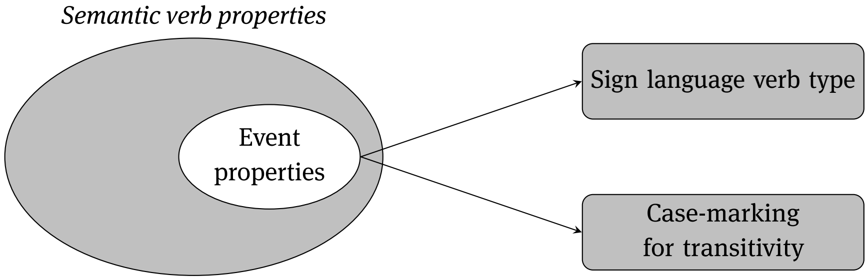


Fig. 3.2: A model representing how verb semantics is predicted to affect formal verb properties in signed and spoken languages.

The assumption of overlap between signed and spoken languages 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 are expected not to display any systematicity.

A semantic map makes predictions about the multifunctionality of grammatical elements (see Section 3.3). In this chapter, I treat different verb types as distinct grammatical elements, too. More precisely, I consider the directionality of agreement verbs (including spatial verbs), the body-anchoring of body-anchored verbs, and the potential for localization of neutral verbs to be grammatical markers.[6] With the semantic map for transitivity splits, predictions can be made about the sort of events that verbs of these different types may denote. If sign language verb type and spoken language transitivity marking are indeed governed by the same semantic properties, then there should, in principle, be no violations of the predictions that the semantic map makes.

Independent of whether or not the DGS data obey the restrictions the map imposes, using the map to categorize 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.

6 Chapters 6, 7 and 8 discuss these properties in more detail. Hybrid forms (Section 3.5.5) possess a mix of these qualities.

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, Salzmann & Steinbach 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 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 from Table 2.2 in Table 3.1) were identified in the corpus data and annotated according to the guidelines described in Chapter 2. I did not find lexical verb forms for all of the verb meanings: some meanings (N=16) were represented in the data by non-lexical classifier predicates only, while no examples were attested at all for six other verb meanings. These 22 meanings are indicated with a strikethrough in the table. Nine verb meanings were expressed both with classifier predicates and lexical signs in the data; these are marked with an asterisk.

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 classification I adhere to slightly deviates from the original tripartite system proposed by Padden (1988). Firstly, I make a distinction between 'body-anchored verbs' and 'neutral verbs', while Padden

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

Tab. 3.1: The ValPaL verb meaning list. Verb meanings with a strikethrough are either exclusively conveyed by classifier predicates in the data, or are not attested in the data set. Verb meanings followed by an asterisk can be expressed both by lexical signs and by classifier predicates.

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~~

Tab. 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	agreement	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	(-)

groups these together in the 'plain verb' category.[8] Secondly, I collapse Padden's

8 Actually, 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 Chapter 7.1.1 for further discussion.

agreement verbs and spatial verbs into the single category of 'agreement verbs' (in line with Janis 1992, 1995; Quadros & Quer 2008), 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 approach taken in this chapter may help determine whether this alternative classification is justified on semantic grounds.

In total, there are 713 examples with 51 body-anchored verb forms, 524 with 24 agreement 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 11.4.5 for a brief discussion of impersonal constructions in DGS). Subtraction of these examples yields a final data set of 1,085 examples, including 555 examples with body-anchored verbs, 335 with agreement and spatial verbs, and 195 with neutral verbs. Note that different forms representing the same verb meaning are not necessarily of the same type: DIE1 is a neutral verb, for instance, whereas DIE2 and DIE3 are both body-anchored verbs.

3.3 A semantic map approach

Semantic maps function as a typological tool 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. They then 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

9 The 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.

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), and 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 attested in language because these categories are directly connected on the map. In contrast, a marker expressing only direct evidence and partial (un)certainty/probability would be unexpected, since there are intervening categories. 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.

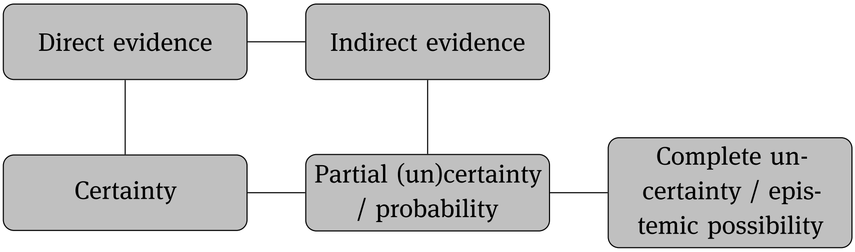


Fig. 3.3: A semantic map of epistemic evidentiality (Boye 2010), reproduced with minor adaptations.

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, facilitating 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.

10 Boye (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.

Since the verb-type system in sign languages appears to be at least partially rooted in semantics, a semantic map could be a valuable tool for characterizing sign language verb types. It is also known that verbs with similar semantics can be of different types in different 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 up 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 by 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 & 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 demonstrate is the case.

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

Hopper & 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 & 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 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). Thirdly, 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 & Thompson (1980) consider transitivity to be 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 to be fundamentally governed by the same principles. Tsunoda (1981, 1985) arranges different semantic verb classes into 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

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

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

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.

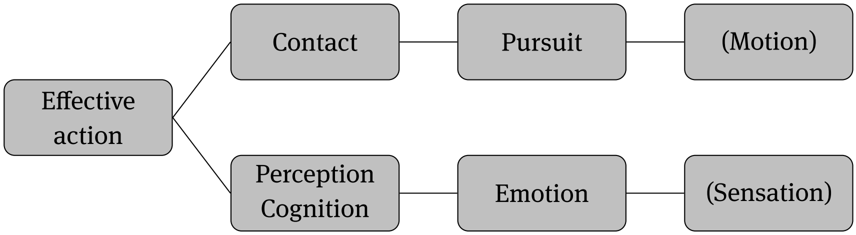


Fig. 3.4: Two-dimensional transitivity hierarchy (Malchukov 2005).

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: A becomes increasingly more like an experiencer, while O becomes increasingly more like a stimulus or causer.

Malchukov (2005) points out 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 (based on 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 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 even 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.

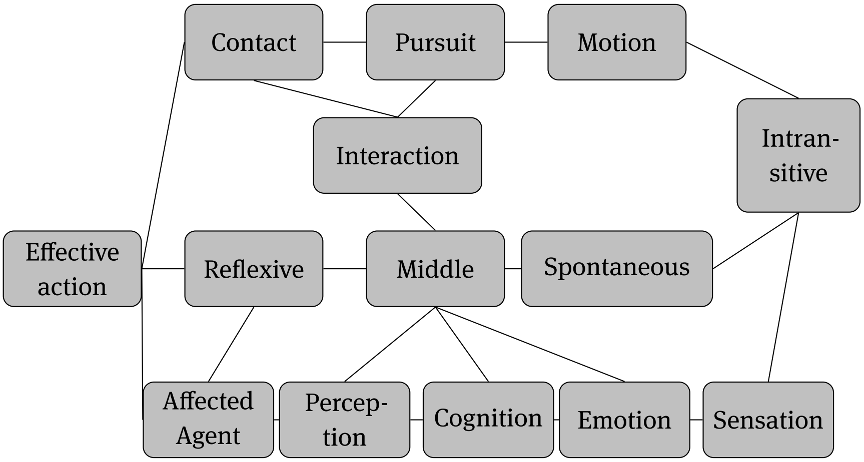


Fig. 3.5: Semantic map for transitivity splits (Malchukov 2005).

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

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, for instance, when verbs of perception in a particular language receive a transitive case-frame, there is no implication 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 the 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.

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

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

3.5 DGS verbs on the semantic map

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 3.5.4) before highlighting a number of interesting cases of verbs with hybrid properties (Sections 3.5.5). Section 3.5.6 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, following 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:

14 Somewhat 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.

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

- 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’ categories. 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 gray of the verb form labels distinguish verb types. Body-anchored verbs are represented in the lightest gray, followed by neutral verbs, agreement and spatial verbs in increasingly darker gray tones. Verbs that are members of two semantically closely related categories are placed on or near their connecting lines.

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

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

3.5.2 Body-anchored verbs

Figure 3.7 organizes 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 one verb of this type.[16] Still, the largest concentration of body-anchored verbs can

16 Note that even if such interruptions were attested, this state-of-affairs would not necessarily constitute evidence against the hypothesis that verbs of particular types belong to semantically

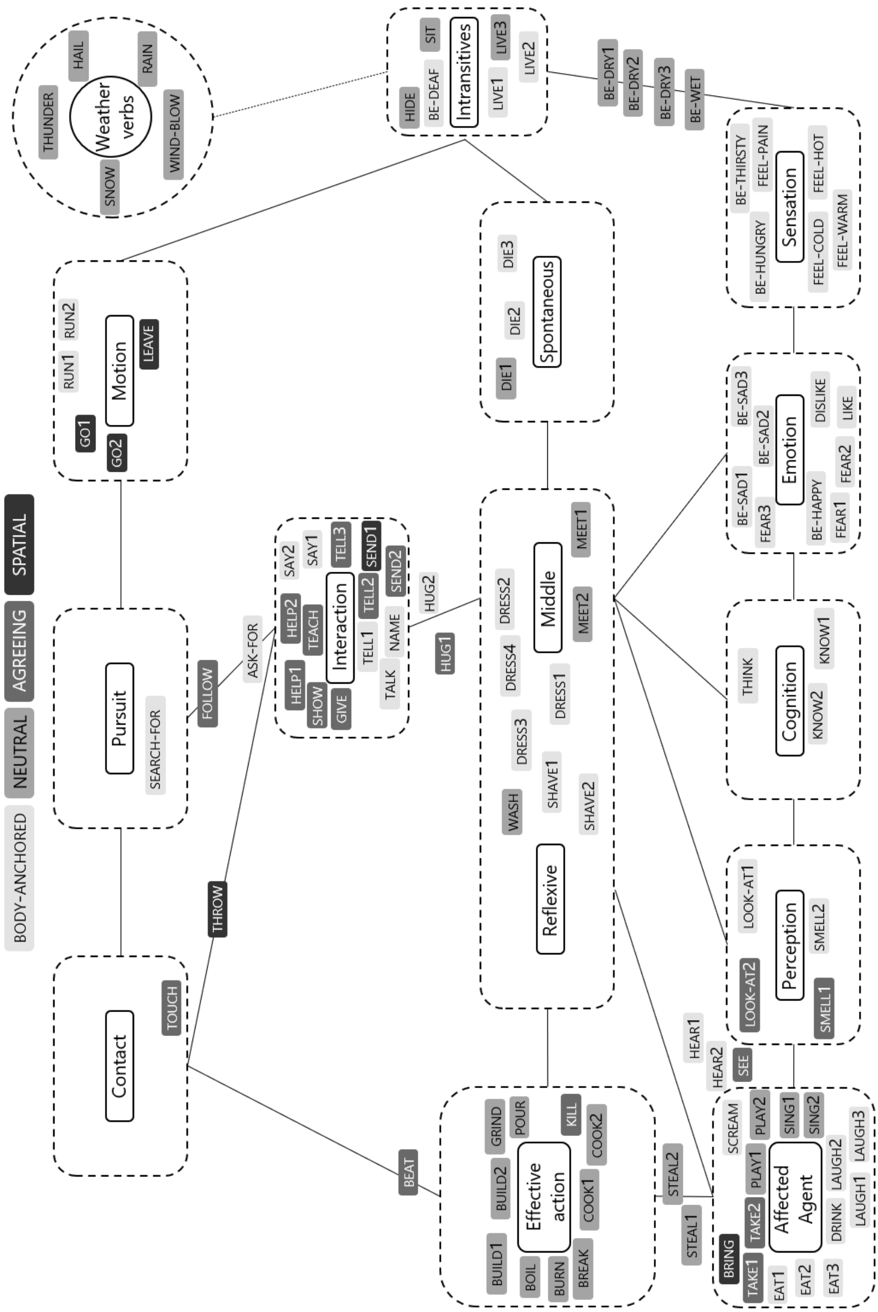


Fig. 3.6: Malchukov's (2005) semantic map with the verb forms from the DGS corpus data.

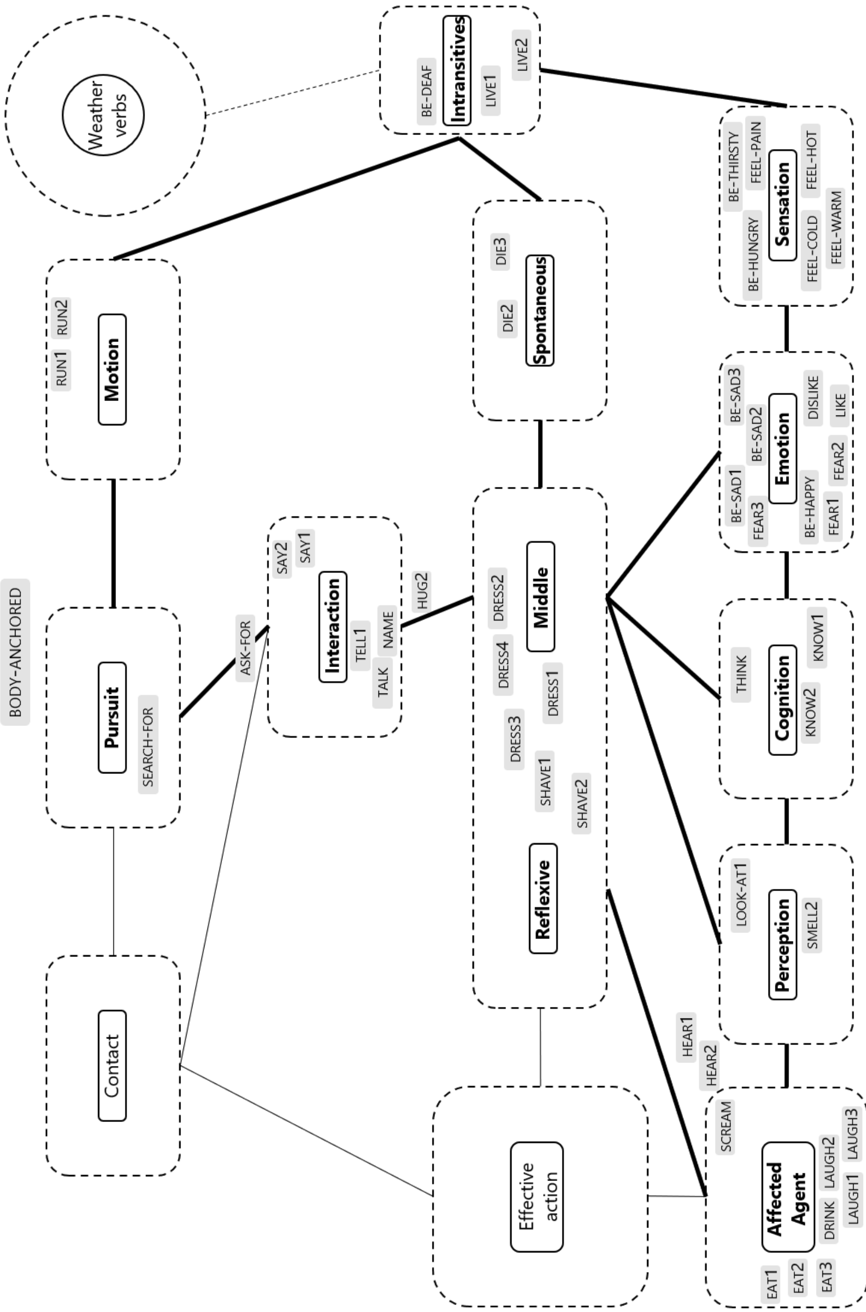


Fig. 3.7: Body-anchored verb forms on the semantic map.

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, as one moves further along this dimension, A becomes more like an experiencer, while O becomes more like a stimulus or causer. 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), thus emphasizing the less agentive and more experiencer-like properties of the A argument.[17] The verb forms KNOW1 (Figure 3.8a) and LIKE (Figure 3.8b) provide some illustration; also see Chapter 4 for further discussion.[18]

(a) KNOW1 (Cognition) **(b)** LIKE (Emotion) **(c)** SEARCH-FOR (Pursuit)

Fig. 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 denote actions one performs on oneself and therefore typically involve the body, while

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 was expected 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.

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

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

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. The two body-anchored verb forms for the verb meaning DIE both refer to a throat being slit, 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.

(a) RUN1 **(b)** RUN2

Fig. 3.9: Two body-anchored signs denoting the verb meaning RUN (Motion).

In sum, body-anchored verb forms most prominently cluster around the semantic categories on the lower dimension of the map, which includes 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 4.3.

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 at 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).[19] Reflexive uses of the verb, which may be expected to be body-anchored, were not attested in the corpus data.

(4) $\quad$ INDEX$_a$ CAREFREE $\overline{\textbf{WASH}\ \text{CAREFREE}}^{\text{rs}}$
'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 6 and 7.

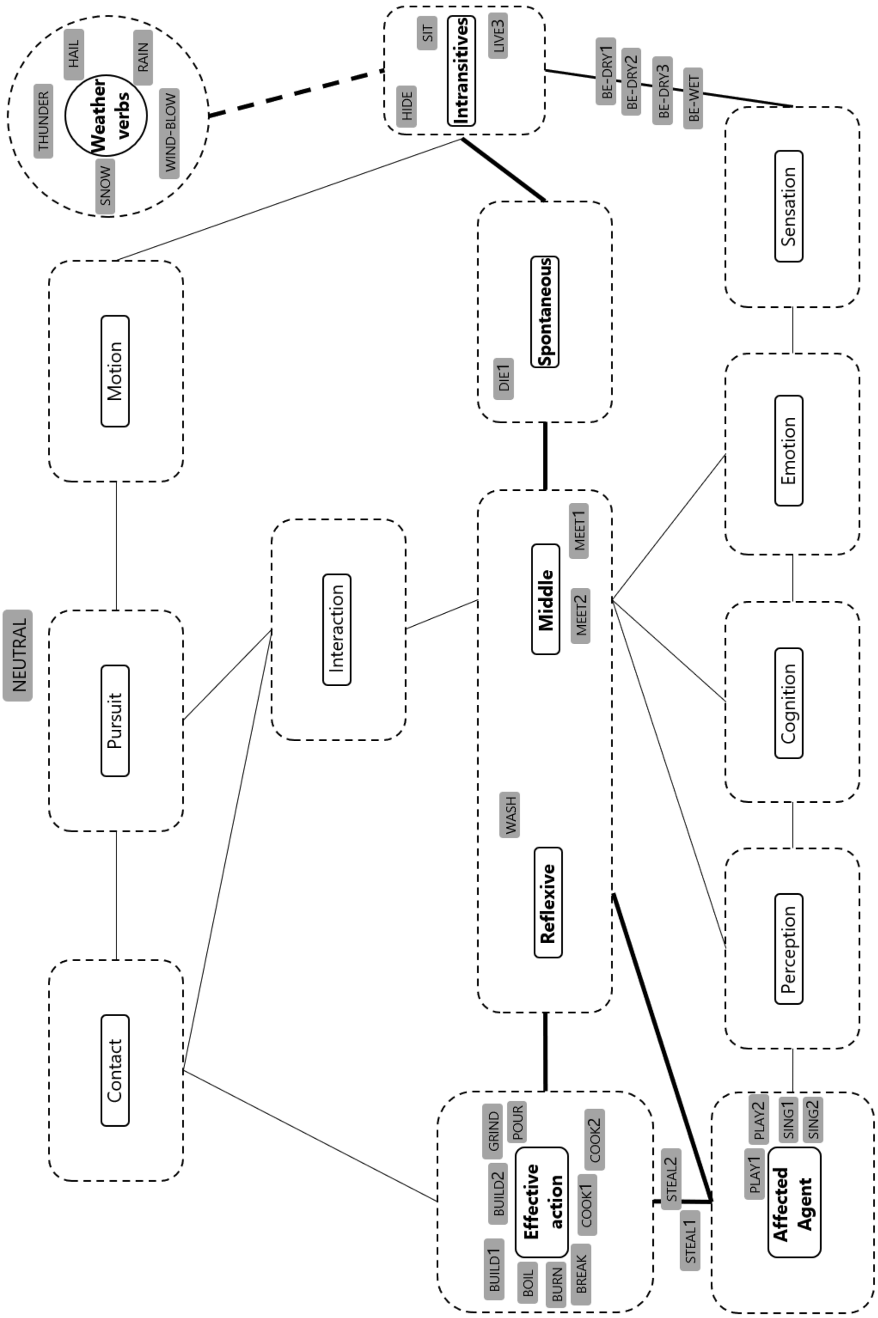


Fig. 3.10: Neutral verb forms on the semantic map.

(a) MEET1 **(b)** MEET2

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

3.5.4 Agreement verbs

Figure 3.12 positions the agreement verb forms in the data set on the semantic map. Spatial verbs, which are treated as a subtype of agreement verbs and are classified on the basis of their semantics, are displayed in a darker shade of gray.[20] For the sake of illustration, Figure 3.13 displays three verb forms: BEAT (Figure 3.13a) and TEACH (Figure 3.13b) are of the agreement kind, while LEAVE (Figure 3.13c) is of the spatial kind.[21]

Agreement 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 verbs of the spatial kind. Regular agreement verbs are most frequent in the 'Interaction' category – which is again hardly unexpected given that interaction events typically involve two (animate) participants, which agreement 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,

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

20 In Chapter 8, I investigate whether there are any morphosyntactic differences between agreement and spatial verbs in DGS that would justify classifying them as different types.

21 The 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.

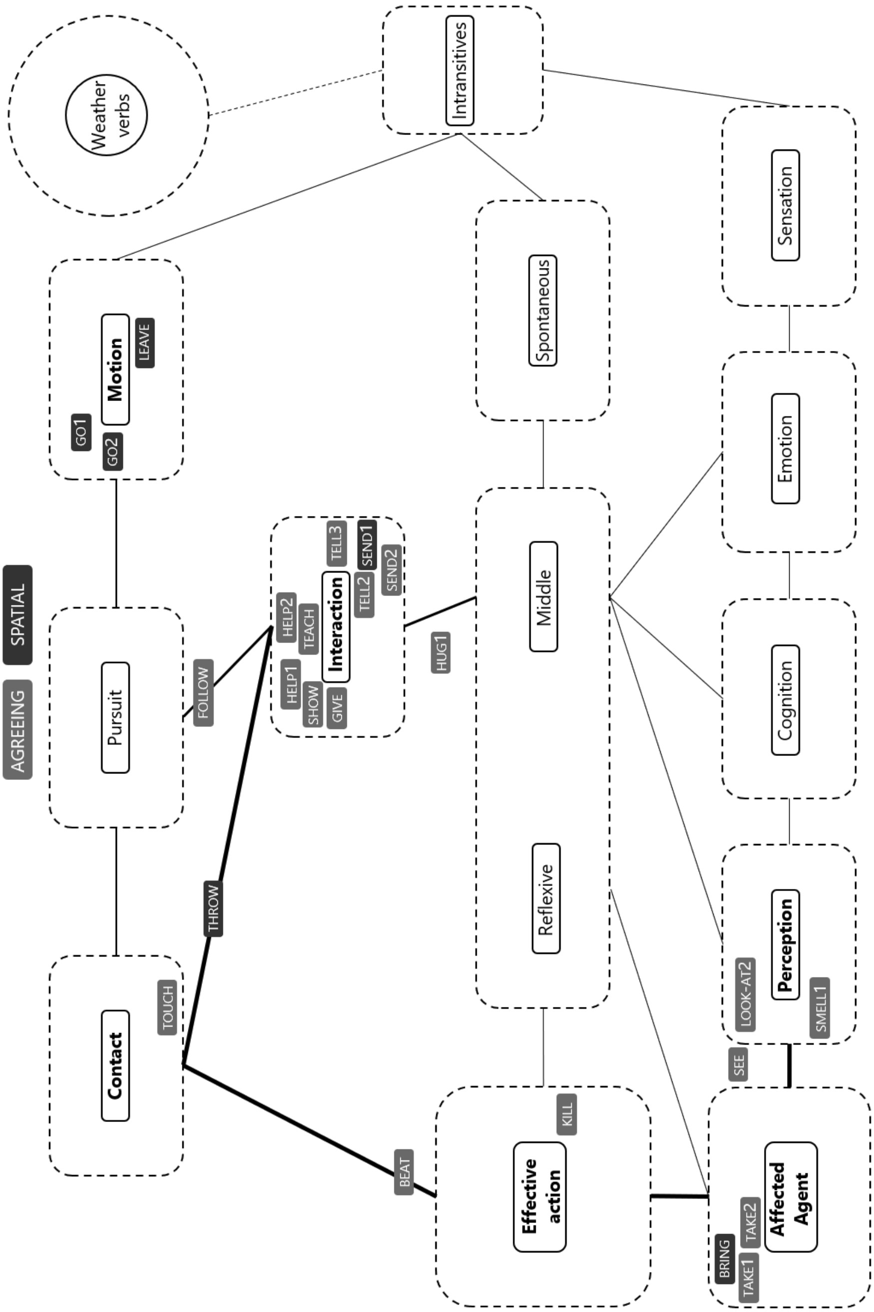


Fig. 3.12: Agreement and spatial verb forms on the semantic map.

(a) $_{1}$BEAT$_{a}$ (Eff. Action/Contact) **(b)** $_{a}$TEACH$_{1}$ (Interaction) **(c)** $_{a}$LEAVE$_{b}$ (Motion)

Fig. 3.13: Three agreement verbs from different semantic categories.

that this state-of-affairs is merely symptomatic of the limited set of verb meanings 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 agreement verbs in sign languages (Meir 1998, 2002) have been characterized as verbs of transfer, one might hypothesize that agreement 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. Agreement 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 agreement 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, for instance, the verb meanings TEACH and LOOK-AT).

3.5.5 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. verbs 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.

(a) LOOK-AT1 **(b)** LOOK-AT1 **(c)** LOOK-AT2

Fig. 3.14: Two instances of the hybrid LOOK-AT1 and one instance of the regular agreement verb LOOK-AT2.

Firstly, consider the verb form LOOK-AT1 (Figure 3.14a-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 3.14b), 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 agreement verbs. LOOK-AT2, on the other hand, has an identical handshape but also involves an arc movement, which can be freely modified to show directionality (Figure 3.14c). This verb is therefore analyzed as a regular agreement 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 (Lillo-Martin 2012; Herrmann & Steinbach 2012). Indeed, the verb itself is also consistently marked by non-manual role-shift markers (see Herrmann & Steinbach 2012 for a description of such markers in DGS, also see Chapter 1.1.1).

(5) INDEX$_1$ $\overline{\textbf{LOOK-AT1}}^{\text{rs}}$ / $\overline{\text{ALSO NOT BAD PU}}^{\text{rs, hs}}$
‘I thought: “That’s also not bad.”’ [koe03-A-09:13.70]

At this stage, it is not entirely clear whether tokens where the fingertips point toward a locus associated with a referent, as in Figure 3.14b, 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 agreement.

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 agreement with an object, I classified it as an agreement verb instead of a body-anchored verb. Yet, it should be evident that both SEE and LOOK-AT1 do not perfectly fit in either category.

HUG1 also displays properties of body-anchored verbs and agreement verbs; Figure 3.15a presents an example. Unlike SEE, HUG1 is a backward agreement 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 3.15b).[22]

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 3.16 illustrates the example. Note that the locus for the object (‘hearing people’), toward the signer’s left, had already 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 agreement verbs. Likewise, HUG1 is situated between the ‘Interaction’ and ‘Reflexive/Middle’ categories – precisely at the junction of the areas occupied by agreement verbs and body-anchored verbs. Moreover, SEE, LOOK-AT1, and LOOK-AT2 are found in another corner of the map in which the domain of agreement verbs ends and that

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

(a) HUG1

(b) HUG2

Fig. 3.15: Two lexical forms denoting HUG; HUG1 (a) is a hybrid, while HUG2 (b) is a regular body-anchored verb.

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, as I will argue in Section 3.6.

Fig. 3.16: A token of SAY1 in the corpus data displaying object agreement.

The hybrid forms discussed above all combine properties of body-anchored and agreement verbs.[23] 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, 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-saggital plane, with the hands converging to make contact approxi-

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

mately at the center of neutral space.[24] 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 3.17, 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 same location as where the signer's left hand begins the movement.

Fig. 3.17: MEET1 with apparent agreement properties.

One could object that the verb in Figure 3.17 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. Firstly, in the token in Figure 3.17, the third-person referent is actually a plural ('parents') but 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 also a clearly observable moment of contact between the hands whereas it is unlikely that the event denoted by the verb involves contact. Similar observations speaking 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 & 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 that combine properties of neutral and agreement verbs. Indeed, they are positioned on the semantic

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

map at the junction of the domains of neutral verbs and agreement verbs. Other symmetrical verbs, such as KISS, are likely candidates for displaying similar hybrid properties in DGS, although future research is required to bear that out.

3.5.6 Summary

The sections above have demonstrated that each verb type in DGS 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. Agreement verbs and spatial verbs 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 of 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 occurs along the pathways indicated in the map, as indeed the prediction would be. In the next section, I expound on this and other issues, and reflect on what the results 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 1.1.3). 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.[25] These verb types differ in their agreement properties, and it is commonly assumed that verb semantics determines

25 Of course, as previously discussed in Chapter 1.1.3, 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 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 (e.g. KNOW1 in (6c)), which cannot be modified, are described by Meir (1998, 2002) in negative terms, i.e. as not denoting transfer or motion.

(6) a. INDEX$_a$ INDEX$_1$ FOR GRANDCHILD $_1$**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. INDEX$_1$ **KNOW1** GOOD
'I know it well.' [hh01-A-03:19.00]

At the same time, it is known that verbs denoting the same meaning may have different agreement properties – and thus belong to distinct categories – in different sign languages. 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 agreement 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 (Quadros & 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, Salzmann & Steinbach 2018) have all reported on verbs that have developed from body-anchored verbs into agreement 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-agreement forms – are said to have originally displayed only object

for agreement verbs, which have been variously referred to as 'movement verbs' (e.g. Supalla 1990), 'directional verbs' (e.g. Fischer & Gough 1978; Lillo-Martin & Meier 2011), and, gaining more traction in recent years, 'indicating verbs' (e.g. Liddell 2000; Cormier, Fenlon & Schembri 2015). The terms often allude to particular views on the linguistic status of agreement (see Chapter 8.1 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 research hopes to answer is whether it holds up against the knowledge acquired over the past three decades – up to and including the current work.

agreement. Examples reported by Meir (2012, 2016) and Meir et al. (2007) for ISL include TELEPHONE, TELL, ASK, and HATE, while in DGS, TELEPHONE and TRUST are said by Pfau, Salzmann & Steinbach (2018) to have undergone such a change.[26] Indeed, I have shown in Section 3.5.5 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 convincingly fit the mold of any of the categories within or across sign languages and in 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 having the capacity to handle 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 agreement verb, the map simply predicts that contiguous categories should also include agreement verbs when they border on other categories that include such verbs too. Thus, if a language contains agreeing 'Affected Agent' verbs in addition to agreement verbs of cognition, then it must also have agreement verbs of perception in order not to violate the predictions the map dictates.[27]

In addition, the diachronic changes reported in Engberg-Pedersen (1993) and Meir et al. (2007), and Pfau, Salzmann & Steinbach (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.[28] As a thought experiment, to illustrate this point, imagine that all verbs in a particular sign language were body-anchored

26 Pfau, Salzmann & Steinbach (2018) additionally note that a similar change has occurred for the verb TELEPHONE in NGT.

27 That being said, it should be noted that both HATE and TRUST in DGS have been described as hybrids in other sources (Pfau, Salzmann & Steinbach 2018; Macht 2016), thus leading to the prediction that DGS should also have hybrid or fully agreement 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.

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

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 can predict this subset to include verbs belonging to semantic categories that are connected on the map, e.g. the 'Effective action', 'Contact', 'Pursuit', and 'Interaction' categories. 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 agreement verbs in the 'Effective action' and 'Pursuit' classes, but not in the 'Contact' class, for instance.

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. Meir 1998, 2002; Costello 2015; Lourenço 2018).[29] Perhaps, then, there might also be a second dimension of change where verbs articulated at the center of the signing space 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 7 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-agreement 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.

3.7 Conclusion

In this chapter, I have shown that each verb type in DGS occupies a distinctive and generally contiguous area on the map. Body-anchored verbs predominantly occur along the lower dimension and tend to denote events involving an experiencer. Neutral verbs frequently denote either prototypically transitive or prototypically intransitive meanings, although there are also several verb forms that belong in the 'Reflexive/Middle' and 'Spontaneous' categories connecting these two poles. Agreement verbs are clustered around the upper left part of the map, which includes categories of verbs that select subjects with a relatively high degree of agentivity.

29 I discuss this phenomenon in more detail in Chapter 7.

Hybrid forms are consistently found in categories that include more than one verb type.

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. Here, it should be borne in mind that the more radical the changes are that need to be made, the weaker the claim that transitivity and verb types are governed by common semantic properties.

Altogether, the results provide support for the hypothesis that the same underlying semantic properties govern both case-marking systems in spoken languages and the verb-type system in sign languages, thus underscoring the centrality of these notions in language. As discussed in the previous section, the pathways indicated on the semantic map additionally make predictions about diachronic change. Although diachronic data for sign languages is scarce, the few available sources provide at least some indication that this is the case, with verb forms with hybrid properties typically showing up in semantic categories where verbs from different types overlap.

The next chapter zooms in on the iconic mapping patterns that occur with verb forms of each of the three main verb types.

4 Iconic mapping patterns

The previous chapter demonstrated that, as previously suggested by Meir (1998, 2002), verb-type membership is at least partially semantically grounded.[1] It seems evident that iconicity has a part to play in this, as there is considerable potential in sign languages to represent aspects of a verb's meaning in its form. The iconicity-mediated link between verb type and verb semantics in sign languages has often been acknowledged in the literature. However, the properties that tend to be iconically represented in verb forms of different types have not been well described except in the most general terms.

This chapter scrutinizes the iconic properties of the 106 verb forms in the German Sign Language (DGS) data set in order to contribute toward our understanding of the role of iconicity in the relation between verb semantics and verb type in DGS and, by extension, other sign languages with similar verb type systems. The aim is to establish which event properties are commonly iconically represented in DGS verb forms, and which of those can additionally be associated with verbs of a specific type.

Section 4.1 introduces the iconic mapping, a descriptive method used to represent the recurring iconic mapping patterns in the data. The procedure for data collection, categorization and analysis is outlined in Section 4.2. Subsequent sections presents detailed descriptions of the recurring patterns identified across verb forms. Section 4.3 discusses body-anchored verb forms; Section 4.4 focuses on neutral verb forms; Section 4.5 scrutinizes agreement and spatial verb forms. Section 4.6 concludes.

4.1 Iconic mappings

In sign languages, iconicity in lexical forms is pervasive. A descriptive method that has been used to represent iconic associations between articulators (i.e. form) and source domain (i.e. meaning) in signs is the iconic mapping (Taub 2000, 2001). An example of an iconic mapping for the sign DRILL in American Sign Language (ASL) is reproduced in Table 4.1 (reproduced from Taub 2000, 2001). DRILL is articulated with a -handshape moving toward the flat non-dominant hand at the center of the signing space, such that the index finger of the dominant hand ends up

1 A version of this chapter will be published as: Oomen, Marloes. In press. Recurring iconic mapping patterns within and across verb types in German Sign Language. In *Iconicity in Language and Literature*, vol. 18.

https://doi.org/10.1515/9783110742787-004

between the fingers of the non-dominant hand. The form thus iconically represents a drill penetrating a wall. The advantage of an iconic mapping is that it allows us to separately consider different phonological properties of a sign to arrive at a more detailed, less holistic, characterization of iconic form-to-meaning mappings.

Tab. 4.1: Iconic mapping for the ASL sign DRILL, reproduced 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

In this chapter, iconic mappings will be used to identify which iconic form-to-meaning mappings recur across (groups of) body-anchored, neutral, agreement, and spatial verbs in DGS; details on the methodology are discussed in the next section. Note that some verb forms, such as various verbs of emotion, involve metaphor. Taub (2000, 2001) argues that metaphoric signs involve two mappings: an iconic mapping between Articulators and Source (e.g. a -handshape mapping onto eyes for seeing), and a metaphoric mapping between Source and Target (e.g. mapping seeing onto understanding). Metaphoric mappings are not represented in this chapter because metaphor does not play a role in all verb forms, and as such a metaphoric mapping is not always relevant. Some verb forms involving metaphor are briefly discussed in the text for clarification.

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 (Bosworth & Emmorey 2010), suggesting that language acquirers do not necessarily pay iconic properties of signs much attention.[2]

2 However, more recent research has shown that iconic signs are the first to be acquired by deaf children of deaf parents, even when relevant variables are controlled for (Thompson et al. 2013).

4.2 Methodological procedure

As described in Chapter 3, 106 different verb forms were identified and annotated (see Chapter 2 for a detailed description of the annotation procedure), and all forms were categorized according to their phonological characteristics. Verbs articulated on or close to the body were categorized as body-anchored; verbs articulated in the signing space and without a path movement as neutral; verbs articulated with a directional (path) movement as agreement. This yielded a total of 51 body-anchored verb forms, 31 neutral verb forms, and 24 agreement verb forms (including six spatial verb forms).

The next step was to identify subgroups of forms based on shared iconic mappings. There are many possible ways in which this could have been done, given that there are also many possible ways in which signs can be iconically motivated. For the purposes of the present study, the mappings needed to be broad enough to be generalizable over multiple verb forms, but also fine-grained enough to be distinguishable between verb forms belonging to the same type. I decided, therefore, to focus on identifying iconic mappings involved in the specifications of the three main phonological parameters (handshape – location – movement; Stokoe 1960/2005).

Before continuing with a description of the procedure, let me point out that the phonological parameters of hand/palm orientation and non-manual marking are not systematically considered in this study. The status of orientation as an independent phonological parameter is debated (e.g. Brentari 1998), and I have therefore chosen to leave it out of the analysis. Non-manual markers, and specifically facial expressions, are not included because many verb signs are not lexically specified for them; i.e. although verb forms are frequently accompanied by facial expressions when they are articulated, the expressions used often vary depending on the context. This suggests that such non-manuals are not an intrinsic part of the lexical sign. There are some exceptions: many verbs of emotion, for instance, seem to be lexically specified for facial expressions that convey the denoted emotion (see Oomen 2017 for a similar observation for Sign Language of the Netherlands). However, as many verb forms do not include lexically specified facial expressions, non-manual marking is not taken into account in the analysis presented here.

Thus, the analysis focuses on identifying recurring iconic mappings that target the phonological parameters of handshape, location, and movement. Significantly, the three main verb types can be naturally distinguished from one another based on their location specifications, while movement additionally distinguishes agreement verbs (and the subtype spatial verbs) from body-anchored and neutral verbs. To repeat from Chapter 2.3.3, body-anchored verbs are articulated on or near the body; neutral verbs are articulated in the signing space in front of the signer, and agreement/spatial verbs are articulated with a path (or other directed) movement and as such involve two relevant places of articulation. It is evident that these basic phonological differences between verb types are linked to semantic differences, and, as demonstrated in Chapter 3, this connection exists precisely because of iconic mappings between location and movement specifications and particular semantic properties of the events denoted by verbs of different types. Thus, each verb type is characterized by a different basic iconic mapping pattern matching location and/or movement to relatively crude semantic distinctions. In Sections 4.3, 4.4, and 4.5, I begin the discussion for each of the three main verb types with a characterization of this initial basic mapping between location and/or movement specifications and basic event properties. This takes us as far as previously proposed basic mappings distinguishing verb types, such as Meir's (1998; 2002) proposal that the (path) movement in agreement verbs maps onto transfer, or Meir et al.'s (2007) intuition that the body in body-anchored verbs maps onto the body of the thematically most prominent participant in the event denoted by the verb ('body as subject').

Even a cursory glance at the verb forms in the data set makes it immediately clear that handshape is also frequently iconically motivated in DGS verb forms. Moreover, in contrast to the specifications for location and movement, there is clear variation in the handshape types that are attested among verb forms of each type. As such, forms within each verb type category can be subcategorized according to their handshape specifications, and this is indeed the approach I have taken.

In categorizing forms according to their handshape type, I made liberal use of general handshape categories that have been proposed in the context of classifier predicates in sign languages (see Zwitserlood 2012 for a literature overview). Classifier predicates are highly iconic, productive signs which combine a 'depicting' handshape with a movement, both of which may be adapted depending on the properties of the event that is represented by the predicate. The main handshape types that are distinguished in classifier predicates include handling, (whole-) entity, and body-part handshapes. All these types of handshapes are clearly iconic. As it turns out, the same handshape types are also frequently attested in the lexical verb forms discussed in this study.

It is worth noting that handshape type has been argued to be related to argument structure in classifier predicates (Benedicto & Brentari 2004). To give an example, the whole-entity classifier  may be used to represent a flat, rectangular object, such as a book, and it can combine with a movement that iconically represents that object's movement (e.g. a book falling off a table). Benedicto & Brentari (2004) claim that constructions with whole-entity classifiers are unaccusative. In contrast, a construction with a handling classifier is transitive. An event in which a person picks up a book, for instance, may be demonstrated with the use of the handling classifier .[3]

Unlike productive classifier predicates, the lexical verbs included in the present study have fixed handshapes. They might thus be regarded as ‘frozen’ signs which have undergone a process of lexicalization (Zwitserlood 2012). An interesting question to consider is whether these forms have nonetheless retained some of their morphological complexity (as also argued by Brentari & Goldsmith 1993; Sandler & Lillo-Martin 2006), such that lexical verbs with handling handshapes tend to denote transitive events, while verb forms with entity handshapes are more likely to denote intransitive events. This matter is further addressed in Chapter 5.

Thus, verb tokens in the data set were first classified as one of the three main verb types based on their phonological specifications for location and movement, and were subsequently divided over various subcategories based on their handshape specifications. This approach resulted in categorizations ranging from five to seven different classes of verbs per type, including up to 14 different verb forms per category.

Thus far, the categorization of verb forms is essentially based on phonological specifications of the sign. Now, the assumption is that particular sets of phonological properties often iconically map onto particular properties of the event denoted by the verb form. The next step, therefore, was to map the specifications for handshape, movement and location onto aspects of meaning. Handshape mappings were characterized first, as these determined the categorization within verb types. As discussed above, location and movement involve a general mapping that distinguishes verb types, but this basic mapping may be enriched depending on the type of handshape used. For instance, a movement toward the body in combination with a handling handshape yields a direct mapping with the movement of a hand, holding an object, toward the body. Thus, the final step was to characterize such finer-grained iconic mappings for location and movement, wherever possible.

Finally, a note of caution: the identification of iconic properties in verb forms is necessarily subjective, to a certain extent. After all, iconicity is not the same as transparency. Thus, it is possible that some verb forms discussed in the next section could be recategorized into other categories depending on how apparent iconically motivated aspects of their phonological form are interpreted. For some verb forms, I verified my own judgments with two native signers of DGS, but their interpretations are, of course, also subjective. Indeed, some handshape forms are simply iconically ambiguous. Think of a -handshape, for instance, which can both represent a

3 But see Kimmelman et al. (2019) for systematic exceptions to the general pattern described by Benedicto & Brentari (2004) in four sign languages, including DGS.

cylindrical object (e.g. a cup) as well as a hand holding it. I wish to point out that this study is less interested in the characterization of individual forms as it is in extracting general recurring patterns. While it is clearly of importance that at least a comfortable majority of verb forms is appropriately classified, I feel confident that the general patterns identified and discussed in this paper would not change dramatically as a result of the reclassification of a handful of verb forms. Images of all verb forms are available at https://www.doi.org/10.21942/uva.14336543; I invite the reader to inspect them and make their own evaluations.

The next sections present the recurring mapping patterns identified per verb type. The mappings for body-anchored verb forms are presented in Section 4.3, followed by those for neutral verb forms in Section 4.4 and agreement verb forms (including spatial forms) in Section 4.5. Every iconic mapping is discussed separately with the use of an iconic mapping schema and several examples of verb forms that display the pattern. Section 4.6 briefly summarizes the findings; Chapter 5 relates the patterns described in the present chapter to those in Chapter 3.

4.3 Body-anchored verb forms

Table 4.2 represents the recurring iconic mapping patterns that were attested across the 51 body-anchored verb forms in the data set. All body-anchored verb forms, by definition, are articulated on or near the signer's body, and it is clear that this place of articulation is almost always iconically motivated: the body of the signer can usually be mapped onto the body of a particular event participant.[4] Thus, the primary division that can be made is between forms that involve a body-to-body mapping (categories I–VI) and forms that do not (category VII). For the verbs that do possess an iconic body-to-body mapping, six subtypes are distinguished based on other properties of the manual sign. The categories I to VI are not organized at random: the ordering reflects different degrees of involvement of the body vis-à-vis the external environment. That is, category I verb forms put the most emphasis on body-external facets of an event, while category VI 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. The theoretical significance of this observation is discussed in more depth in Chapter 5. All categories are discussed in turn below.

4 Also see Meir et al. (2007), who have previously made a similar point. Their study is discussed in some detail in Chapter 6.1.1.

Tab. 4.2: A typology of body-anchored verb forms (N=51) in DGS based on iconic mapping patterns.

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

4.3.1 I: Instrument

The verb forms DIE2, DIE3, EAT3, SHAVE1, and SHAVE2 make reference to an action being performed on the body with the use of a tool or instrument. Three forms are shown in Figure 4.1 and discussed below.[5]

(a) DIE3 **(b)** EAT3 **(c)** SHAVE1

Fig. 4.1: Three body-anchored verb forms of category I.

With its -handshape, DIE3 references a long, sharp tool such as a knife. EAT3 makes reference to the movement of a fork toward the mouth, while the handshape in SHAVE1 appears to represent hair clippers. This latter form is ambiguous: the handshape could also represent a hand holding a razor rather than the tool itself, in which case it would involve a category II mapping.

5 EAT3 is a one-handed sign articulated with a -hand, a loose version of which is used by the signer in Figure 4.1. The signer's left hand simultaneously articulates a different sign, unrelated to the verb EAT3.

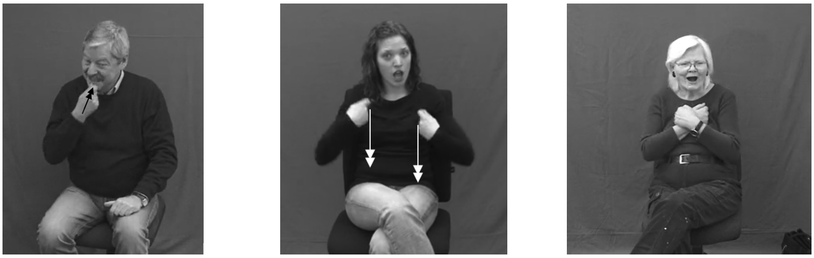
Table 4.3 presents the iconic mapping. The use of a whole-entity handshape, mapping onto an instrument, leads to an iconic interpretation of the place of articulation of the verb as the point of contact between instrument and body. The movement maps onto the movement trajectory of the instrument on or toward the body. The signer's body, as a result, can be interpreted as an affected referent (not represented in the table).

Tab. 4.3: Iconic mapping for category I body-anchored verb forms.

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

4.3.2 II: Hand(s): holding

Category III includes eight forms with handling handshapes. The forms are DRINK, EAT1, EAT2, HUG2, and four variants of the sign DRESS; three of them are depicted in Figure 4.2.



(a) EAT2 **(b)** DRESS1 **(c)** HUG2

Fig. 4.2: Three body-anchored verb forms of category II.

EAT2 references a hand holding food and moving it toward the mouth, and DRESS1 represents the act of putting on e.g. a sweater by pulling it down over the torso with the hands. 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 a handling event, with the difference that the arms rather than the hands are doing the holding.

Table 4.4 presents the iconic mapping for verb forms of category II. The mapping patterns are similar to those for category I verbs, with the crucial difference that the hands represent hands and not instruments. This leads to an interesting division of labor between the hands and the body of the signer: the former can be said to represent those of an agentive entity, while the latter reflects that of an entity undergoing the action executed by the hands. 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. This observation basically echoes Meir et al.'s (2007) intuition that there is a division of labor between the body and the hands. The body – being static – represents just a single aspect of the event denoted by the verb, which is an event participant with a particular semantic role. The hands – being dynamic, as they combine specifications for handshape, movement, and location – have the potential to represent a much broader range of event properties (e.g. whether the event involves repeated action or a natural end state (Wilbur 2003); whether there is a change of state, etc.), including properties of the event and other event participants.

Note, however, that I do not wish to make any claims about the argument structure of the verb forms in this category, i.e. I am not arguing that EAT1 and EAT2 must be transitive events involving an Agent and an Undergoer, although it is certainly possible that there is a correlation (as has been suggested for classifier predicates by Benedicto & Brentari 2004 also see Chapter 5).

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

ARTICULATORS	**SOURCE**
Handshape: handling	Hand(s) holding an object
Movement: contact/tracing	Hand(s) holding object make(s) contact with or trace(s) the body
Location: on/close to body	Locus where hand(s) holding object make(s) contact with the body

4.3.3 III: Hand(s): moving

Category III includes the seven forms ASK-FOR, FEAR3, FEEL-COLD, HEAR2, RUN1, RUN2, and TALK. Like the verbs of category II, all forms in this category involve a one-to-one mapping between the hands of the signer and the hands of a referent. Different is that the hands do not hold an object or perform an action on the signer's body, but simply make a movement that can be associated with a particular action. The hands do not directly affect another entity. As such, the body and the hands form a unit; they participate in the event as one. This pattern is illustrated by the forms in Figure 4.3: ASK-FOR references a begging gesture, TALK represents signing, and FEEL-COLD involves two fists which shake to express shivering.[6]

(a) ASK-FOR

(b) TALK

(c) FEEL-COLD

Fig. 4.3: Three body-anchored verb forms of category III.

Table 4.5 represents the iconic mapping for category III verb forms. Although category II and category III verbs both involve a hands-to-hands mapping, the verb forms in the two categories involve different iconic articulator-to-source mappings. Forms in category III make reference to a single, agentive, participant. In contrast to category II forms, no iconic reference is made to an affected entity.

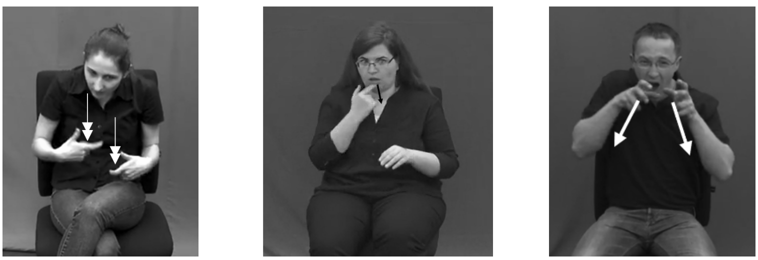
Tab. 4.5: Iconic mapping for category III body-anchored verb forms.

ARTICULATORS	SOURCE
Handshape: body part (hands)	Hand(s)
Movement: non-directional	Hand(s) moving to perform action
Location: signing space (fixed)	Hand(s) performing action in front of the body

6 Recall from Section 4.2 that the forms in Figure 4.3 are classified as body-anchored on the grounds that they make direct reference to body parts and their place of articulation in front of the signer cannot be modified, unlike neutral verb forms.

4.3.4 IV: Body part: external expression

Category IV verb forms make reference to the externally visible or otherwise perceivable expressions of a body-internal experience, and include BE-SAD3, FEAR2, LAUGH1, LAUGH2, LAUGH3, NAME, SAY1, SAY2, SCREAM, and TELL. Three examples are given in Figure 4.4.



(a) LAUGH2 **(b)** SAY1 **(c)** SCREAM

Fig. 4.4: Three body-anchored verb forms of category IV.

LAUGH2 iconically refers to the heaving and falling of the chest when a person is laughing. SAY1 and SCREAM both make reference to the production of sound or speech; in the case of SCREAM, there is also an outward path movement involved which appears to represent the emission of sound. Other forms, including SAY1, do not involve a mapping between hands and body parts, but rather point toward the body part involved in the denoted event. Strictly speaking, such forms are not iconic but indexical. For ease of exposition, and because indexical forms are still motivated even if they are not iconic, they are nonetheless included in the analysis.

Table 4.6 presents the iconic mapping for verb forms of category IV. The hand(s) either represent(s) or, in the case of forms with an indexical -handshape, point(s) toward body parts. The place of articulation of the forms in category IV corresponds to the location of the relevant body parts, and there is a tracing movement over a part of the body (e.g. LAUGH2), or a path movement starting from initial contact with the body (e.g. SAY1; SCREAM). The combined iconic mappings lead to an interpretation of the body as an agent- or experiencer-like referent.

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

ARTICULATORS	SOURCE
Handshape: various / indexical	Body part
Movement: tracing / outward, from initial contact	Movement of or pointing toward body part(s)
Location: body	Locus of body part which performs action

4.3.5 V: Body part: perception

In the five verb forms of category V, the hands make reference to a sensory organ involved in a perception event, such as the eyes, ears or nose. BE-DEAF, SEARCH-FOR, SMELL2 (all depicted Figure 4.5), HEAR1 and LOOK-AT1 are of this type.

(a) BE-DEAF **(b)** SEARCH-FOR1 **(c)** LOOK-AT1

Fig. 4.5: Three body-anchored verb forms of category V.

Table 4.7 presents the iconic mapping for category V verb forms. The hand(s) either represent(s) sensory organs directly (e.g. eyes in LOOK-AT1), point(s) toward them (e.g. ear and mouth in BE-DEAF), or involve(s) a combination of both in what could be regarded as cases of metonymy. An example of the latter is represented by SEARCH-FOR: the index and middle finger, which are bent, appear to have an indexical component but they do not actually point toward the signer's eyes for most of the verb's articulation. As such, the finger tips come to represent the eyes, with the movement being an iconic representation of shifting eye gaze.

Movement specifications for category V forms typically represent the direction of perception, e.g. of eye gaze, even in cases where the orientation of the fingers does not, such as in the form SEARCH-FOR. The signer's body represents an experiencer-type referent.

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

ARTICULATORS	SOURCE
Handshape: body part / indexical	Sensory organ
Movement: directed outward	Direction of perception / pointing toward perception organ
Location: body	Locus of sensory organ

4.3.6 VI: Body part: internal experience

Verb forms in category VI, of which there are 14, make iconic reference to a body-internal event. The forms BE-SAD1, KNOW2, and BE-THIRSTY are represented in Figure 4.6; the other forms in this category are BE-SAD2, FEEL-PAIN, FEAR1, KNOW1, THINK, LIKE, DISLIKE, BE-HAPPY, BE-HUNGRY, FEEL-HOT, and FEEL-WARM.

(a) BE-SAD1 **(b)** KNOW2 **(c)** BE-THIRSTY

Fig. 4.6: Three body-anchored verb forms of category VI.

BE-SAD1 references a feeling of heartache or nausea associated with sadness, and several of the other emotion verbs have similar physical or metaphorical connotations. KNOW2 indexically references the brain as the locus of cognition, while BE-THIRSTY references a dry throat. All of these feelings or states occur internally, yet they are – often metaphorically – iconically referenced in the verb forms of this category. Indeed, I have previously described similar iconic patterns in NGT psych-verb forms in Oomen (2017).

Table 4.8 presents the iconic mapping for verb forms of category VI (recall that metaphoric mappings are not represented in this paper). The combined properties of the manual sign signal that the form denotes a body-internal experience. The handshape tends to be rather abstract but there is always direct contact with the body. The verb's movement is either reduplicated or it traces part of the body. As such, these properties underscore the centrality of the body in the concepts denoted, while the role of the external environment is minimized. The body thus comes to iconically represent an experiencer-like argument.

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

ARTICULATORS	SOURCE
Handshape: abstract / indexical	-
Movement: contact / tracing	Event contained / occurring in body
Location: body	Locus of internal organ

4.3.7 VII: No body-to-body mapping

Finally, the body-anchored verb forms LIVE1 and LIVE2 (Figure 4.7) do not involve a body-to-body mapping, and they are also not clearly iconically motivated in their handshape or movement specifications.

(a) LIVE1 **(b)** LIVE2

Fig. 4.7: Two body-anchored verb forms without a body-to-body mapping.

It is 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 is in fact 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 articulated has been replaced by the handshape used to sign EAT. The verb forms in Figure 4.7 could have undergone similar phonological alteration processes at the cost of iconicity; indeed, the two verb forms also display formal similarities with the ASL sign HOME. Still, if forms are altered to the degree that a body-to-body mapping is no longer evident, they may no longer involve the body of the signer in their representation in the same way that other body-anchored verb forms do.

4.4 Neutral verb forms

In their citation form, neutral verbs share the property that they are articulated at the center of the signing space in front of the signer. Intrinsically, this location does not appear to be iconically motivated. However, specifications for the phonological parameter of handshape – which I will show in this section to be iconically motivated in many neutral verb forms – may make the sign's place of articulation (as well as the movement) meaningful, similar to how the body may take on different iconically motivated roles in body-anchored verb forms.

Table 4.9 presents a categorization of neutral verbs. Two main groups of iconically motivated neutral verbs can be differentiated. In some forms (categories I and II), the hands make reference to properties associated with one entity, while the place of articulation can be associated with another entity. In other forms (categories III, IV, and V), the phonological parameters represent aspects of a single entity. All categories are discussed in more detail in the next section.

Tab. 4.9: A typology of neutral verb forms (N=31) in DGS based on iconic mapping patterns.

Cat. #	Neutral space	Hand(s)	#
I	Hands = entity A; location = entity B	Instrument	4
II		Hand(s): holding	10
III	Hands = entity A; location = entity B	Body part / whole entity (human)	4
IV		Whole entity (object)	5
V		Iconic movement	8

4.4.1 I: Instrument

Category I includes the neutral verb forms BUILD1, BUILD2, GRIND, and POUR, three of which are depicted in Figure 4.8. For each of these forms it is the case that the hand(s) represent(s) an instrument, although the handshapes are sometimes rather abstract. In general, it may be observed that neutral verb forms involve more abstract representations of event properties than body-anchored verbs.

(a) GRIND **(b)** POUR **(c)** BUILD2

Fig. 4.8: Three neutral verb forms of category I.

The form GRIND makes reference to grinding instruments, like grinding stones; the extended thumb in the form POUR maps to the neck of a bottle or flask from which a substance gets poured; BUILD2 makes reference to building by means of stacking or layering building materials. Since the handshape used in this form is quite unmarked, it is difficult to establish whether the hands represent instruments, objects used as building material, 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. Contrast this with body-anchored verb forms, which as a class display clearer iconic mappings overall.

Table 4.10 presents the iconic mapping schema for neutral verb forms of category I, involving whole-entity handshapes representing instruments. Because of that, the verbs' movement specifications can be iconically interpreted as the manner in which the instrument manipulates another entity, while the place of articulation can be associated with the location where the instrument manipulates an entity.[7]

7 POUR 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 construed as the place where the instrument is pouring out the liquid.

Tab. 4.10: Iconic mapping for category I neutral verb forms.

ARTICULATORS	SOURCE
Handshape: whole entity	Instrument
Movement: various	Instrument manipulating / affecting entity
Location: signing space	Locus of instrument manipulating / affecting entity

4.4.2 II: Hand(s): holding

In neutral verb forms of category II, the signer's hands directly map onto hands. The ten verbs included in this category are BE-DRY1, BE-DRY3, BE-WET, BREAK, COOK1, COOK2, PLAY2, STEAL1, STEAL2, and WASH, three of which are illustrated in Figure 4.9.

(a) BE-DRY3 **(b)** BREAK **(c)** STEAL1

Fig. 4.9: Three neutral verb forms of category II.

The form BE-DRY3 appears to reference a finger running across a surface (represented by the non-dominant hand) to evaluate its aridity, BREAK represents hands holding and breaking an elongated object, and STEAL1 makes reference to a hand quickly snatching something away.

Table 4.11 presents the iconic mapping for category II neutral verb forms. There is significant overlap with Table 4.10, with the difference that the handshape represents hands holding an object or instrument, rather than the instrument itself.

Tab. 4.11: Iconic mapping for category II neutral verb forms.

ARTICULATORS	SOURCE
Handshape: handling	Hand(s) of animate (human) entity
Movement: various	Hand(s) manipulating / affecting entity
Location: signing space	Locus of hand(s) manipulating / affecting entity

4.4.3 III: Body part/whole entity (human)

The category III verbs LIVE3, SIT, MEET1, and MEET2 involve whole-entity or body-part handshapes representing a (human) entity.[8] Two forms are depicted in Figure 4.10.

(a) LIVE3 **(b)** MEET2

Fig. 4.10: Two neutral verb forms of category III.

LIVE3 is a two-handed sign in which the tips of the two bent fingers of each hand represent the knees of a human being.[9] It is identical in form to the verb SIT. Thus, LIVE3 also involves a metaphorical mapping (not represented in the iconic mapping table below) between sitting and living. MEET2 references a symmetric event in which two referents participate. The -hands, it appears, represent two pairs of eyes. The point at which the two hands make contact can be construed as the meeting point. MEET1 (with -handshapes representing upright human entities) and MEET2 are actually hybrids between neutral and agreement verb forms, because their

8 There is potential for this category to be split up into two separate ones: one with body-part handshapes, and another with whole-entity handshapes. Given the paucity of verbs in the current Category III, in particular forms involving body-part handshapes, I have refrained from making this split at present.
9 I verified this mapping with two DGS informants. Alternatively, the tips of the fingers could be taken to represent eyes, which would still count as a body-part handshape.

initial places of articulation can optionally be modified to align with referent loci. Thus, in modified form, the initial locations are also semantically meaningful.

Table 4.12 presents the iconic mapping for neutral verb forms of category III. Whole-entity or body-part handshapes represent (part of) a human entity. Movement and location reflect the movement and location (or locations, in the case of modified tokens of MEET1/MEET2) of the human entities.

Tab. 4.12: Iconic mapping for category III neutral verb forms.

ARTICULATORS	SOURCE
Handshape: whole entity / body part	Human entity
Movement: various	Human entity moving
Location: signing space	Locus of human entity

4.4.4 IV: Whole entity (object)

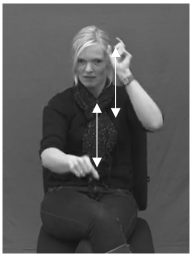
Category IV includes the forms HAIL, RAIN, SNOW, BURN, and BOIL. Three forms are depicted in Figure 4.11. HAIL is articulated with -handshapes that represent hail stones; the tips of the fingers of both hands represent rain drops in RAIN and the bubbles that come to the surface in boiling water in BOIL.[10] Each of these forms involve lexical plurality through the use of two hands (Börstell, Hörberg & Östling 2016). RAIN additionally references multiple rain drops with each finger on both hands representing a rain drop.

The iconic mapping for category IV forms is represented in Table 4.13, and only differs from category III forms in Table 4.12 in having the handshapes represent inanimate as opposed to human entities.

Tab. 4.13: Iconic mapping for category IV neutral verb forms.

ARTICULATORS	SOURCE
Handshape: whole entity	Entity (inanimate)
Movement: various	Movement of entity
Location: signing space	Locus of entity

10 In the case of BOIL, the extended index fingers could alternatively be interpreted as indexical, indicating the upward direction of bubbles in boiling water.



(a) HAIL

(b) RAIN

(c) BOIL

Fig. 4.11: Three neutral verb forms of category IV.

4.4.5 V: Iconic movement

Finally, category V includes eight verb forms with abstract handshapes but iconically motivated movements. The forms included are BE-DRY2, DIE1, HIDE, PLAY1, SING1, SING2, THUNDERSTORM, and WIND-BLOW. Figure 4.12 illustrates three of those verbs.

(a) BE-DRY2

(b) DIE1

(c) SING2

Fig. 4.12: Three neutral verb forms of category V.

In BE-DRY2, the slightly downward movement in combination with the hand-internal change toward contact between the thumb and fingers apparently makes reference to a decrease of something. However, the form's handshape does not give any clear iconic clue as to what sort of entity is being decreased. DIE1 involves a movement that suggests something toppling over, but the handshape is not one that would typically be used to represent human beings or other animate entities. SING2 is articulated with two closed beak handshapes moving sideways, in abstract reference to a melody.

Table 4.14 presents the iconic mapping for category V neutral verbs. Handshapes are not clearly motivated iconically, while movements represent (real or metaphoric) movements of entities. The location of the sign can be associated with the location of that same entity.

Tab. 4.14: Iconic mapping for category V neutral verb forms.

ARTICULATORS	SOURCE
Handshape: various	Various
Movement: various; iconically motivated	Movement of abstract entity
Location: signing space	Locus associated with abstract entity

4.5 Agreement and spatial verb forms

In the literature, various proposals have been made about the semantics behind the path movement (or orientation change) that characterizes agreement verbs and spatial verbs. Perhaps the most prominent one has been Meir's (1998; 2002) claim that path movement denotes transfer from one referent to another in agreement verbs. In spatial verbs, Meir argues, the movement more generally represents the motion of an entity.

Analysis of the agreement verbs in the data set indicates that 'transfer' is not always a good description of the iconic mapping involved in various verb forms because it is not always evident what it is that is being transferred, as in the case of forms such as TOUCH or HUG1. For this reason, I will use a more general qualification which is also applicable to the path movement in spatial verbs, simply proposing that there is an iconic (metaphorical) movement from some location *a* to some location *b*. A *directional* movement, in other words. As with body-anchored and neutral verb forms, handshape type may further enrich this general mapping.

Table 4.15 presents a categorization of agreement and spatial verbs based on their recurring iconic mapping patterns. It can be observed that the iconic handshape mappings for all five categories are familiar from the classifications for body-anchored and/or neutral verbs. The categories are described in more detail in the subsections below.

4.5.1 I: Hand(s): holding

Category I constitutes the largest group (N=12) and includes forms with handling handshapes, which iconically represent the holding or handling of an entity. The

Tab. 4.15: A typology of agreement verb forms and spatial verb forms (N=24) in DGS based on iconic mapping patterns.

Cat. #	Neutral space	Hand(s)	#
I		Hand(s): holding	12
II		Hand(s): moving	3
III	Direction	Body part: perception	2
IV		Whole entity (human)	1
V		Iconic movement	6

forms included in this category are BEAT, BRING, GIVE, HELP2, HUG1, KILL, SEND2, TAKE1, TAKE2, TEACH, THROW, and TOUCH; see Figure 4.13 for three examples.

(a) TOUCH **(b)** THROW **(c)** TAKE2

Fig. 4.13: (a) An agreement verb form, (b) a spatial verb form, and (c) an agreement verb form of category I.

TOUCH, THROW, and TAKE2 all make reference to the direct manipulation or holding of an entity by the hand(s).[11] The use of a handling handshape suggests the presence of (at least) an agentive entity that is doing the handling as well as an entity being handled. The movement, which is usually a path movement, can be mapped onto the movement of the hand(s) from one location in the direction to another.

Since the use of a handling handshape implies that there is also an object being handled, we may ask if it could additionally posited that the location and movement specifications map onto the initial/final locations and direction of the handled entity, too. Although such a mapping works for some verbs, such as BRING, HELP2, and GIVE, it does not seem to apply to all forms. For instance, TOUCH involves a path movement, yet it is implausible that the touched object moves along with the

11 TAKE2 is an ambiguous form which is here interpreted as involving a mapping to bent/clawed fingers that snatch something away, but it may also reference an instrument such as a hook.

handling referent. Rather, the hand-internal change in aperture, with 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. Also, the path movement in a form such as THROW does not fully 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 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 agreement verb and the referent represented by the handling handshape. Consider TAKE2, for instance, which is a backward verb and thus starts out at the locus associated with the object and then moves toward the subject locus. The agentive entity in this event could, in principle, physically move to take a particular object from a particular location to another, but this is not a requirement; the form can also be used in a scenario in which the represented referent's arm merely extends to take an object and then pulls 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.[12]

The path movement in verbs such as KILL and BEAT can be associated with that of yet another entity, namely an instrument. The final place of articulation of these verbs simultaneously corresponds to that of the entity affected by the instrument that is held by the handler, as well as the final location of the instrument and the hand holding it.

Thus, there is a fair amount of variation in the type of entities that may be associated with the path movement and initial and final locations of agreement verb forms in category I. The common denominator across all these forms is that the path (or, more generally, directional movement) corresponds to the movement of the hands of an agentive entity from one location in the direction of another location. Table 4.16 presents the iconic mapping for category I forms.

4.5.2 II: Hand(s): moving

Category II includes verb forms in which the hand(s) represent hand(s) moving, but not handling an object. The three verb forms that are included in this category

12 For a discussion of complexities similar to those described here in classifier predicates in several sign languages, see Kimmelman, Pfau & Aboh (2019) and Kimmelman et al. (2019).

Tab. 4.16: Iconic mapping for category I agreement verb forms.

ARTICULATORS	SOURCE
Handshape: handling	Hand(s) of animate (human) entity holding an entity
Movement: directional	Hand(s) move(s) from the initial location in the direction of the final location
Location: initial location	Initial location of the hand(s)
Location: final location	Final location of the hand(s)

are SEND1 (a spatial verb), SHOW, and TELL2 (both agreement verbs), all depicted in Figure 4.14.

(a) SEND1 **(b)** SHOW **(c)** TELL2

Fig. 4.14: (a) A spatial verb form, (b) an agreement verb form, and (c) an agreement verb form of category II.

The spatial verb SEND1 is articulated with a -hand making a sweeping motion, imitating a gesture used in many communities with the meaning of sending someone away. It is possible that the form is also used gesturally in DGS, although its morphosyntactic behavior is similar to that of other spatial verbs (see Chapter 8). SHOW is articulated with the index finger of the dominant hand touching 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) that one may 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 can be reversed when the talker is a non-first person referent and the person being talked to is the signer, as demonstrated in Figure 4.14 (right). Thus, the movement is directional. In non-reversed form, the dominant hand typically starts out directly in front of the signer and, after a couple of circular movements, ends at a locus further away from the signer. The opposite pattern occurs in the reversed form.

Table 4.17 presents the iconic mapping schema for category II verbs. The handshape directly maps onto the hands of a human participant. The initial place of articulation of the verb can be associated with the starting point of the hand(s) in the represented action, and the final location with the end point. The movement, then, represents the movement of the hands from the initial location in the direction of the final location.

Tab. 4.17: Iconic mapping for category II agreement verb forms.

ARTICULATORS	SOURCE
Handshape: hand(s) moving	Hand(s) of animate (human) entity moving
Movement: directional	Hand(s) move(s) from the initial location in the direction of the final location
Location: initial location	Initial location of the hand(s)
Location: final location	Final location of the hand(s)

4.5.3 III: Body part: perception

Category III includes two forms: LOOK-AT2 and SEE (Figure 4.15), both of the agreement type. 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 and SEE 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.

(a) LOOK-AT2

(b) SEE

Fig. 4.15: Two agreement verb forms of category III.

Table 4.18 presents the iconic mapping schema for category III forms. The handshape maps onto eyes in both cases, and the initial place of articulation becomes associated with the perceiver. The final location can be said to correspond to the object of perception. The movement in the verb forms does not map onto physical movement; rather, it represents the direction of eye gaze from the perceiver to the perceived. Note that SEE and LOOK-AT2 are good examples of verb forms to which the notion of 'transfer' (Meir 1998, 2002) does not seem easily applicable. One could argue that there is transfer of light enabling a referent to see – but in that case, 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 (see Pfau, Salzmann & Steinbach 2018: pp. 16–17 for a similar point).

Tab. 4.18: Iconic mapping for category III agreement verb forms.

ARTICULATORS	SOURCE
Handshape: body part (perception)	Sensory organ perceives
Movement: directional	Direction of perception: from perceiver to perceived
Location: initial location	Perceiver
Location: final location	Perceived entity

4.5.4 IV: Whole entity (human)

Category IV includes a single verb form: FOLLOW (Figure 4.16). The verb 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 they iconically represent.

The motivation for including a one-member category in the classification of agreement verb forms is twofold: FOLLOW does not fit in any of the other categories, and the use of whole-entity handshapes representing human entities is also attested as a strategy in some neutral verb forms (see Section 4.4.3).

Table 4.19 presents the iconic mapping for category IV. The proposed mapping can only be tentative given that there is only one agreement form in the category, but I suggest that the loci represent the beginning and end location of the movement of one or, in the case of FOLLOW, two referents represented by the whole-entity handshape(s). The movement once more represents direction of movement.

Fig. 4.16: The category IV agreement verb form FOLLOW.

Tab. 4.19: Iconic mapping for category IV agreement verb forms.

ARTICULATORS	SOURCE
Handshape: whole entity	Human entity
Movement: directional	Human(s) move(s) from the initial location in the direction of the final location
Location: initial location	Human(s) start(s) movement at initial location
Location: final location	Human(s) end(s) movement at final location

4.5.5 V: Iconic movement

Category V verbs, which include the spatial forms GO1, GO2, and LEAVE and the agreement forms HELP1, SMELL1, and TELL3, are some of the most abstract forms in the data set. Figure 4.17 illustrates three of these forms.

(a) GO1 **(b)** HELP1 **(c)** TELL3

Fig. 4.17: (a) A spatial verb form, (b) an agreement verb form, and (c) an agreement verb form of category V.

In the form GO1, the combination of handshape plus movement functions deictically, but the handshape itself does not iconically map onto a specific entity.

The handshape employed in HELP1 also does not appear to be strongly motivated iconically.[13] TELL3 is a hybrid form articulated in front of the mouth and combined with a circular movement, which may be reversed for agreement purposes (see Figure 4.17c). As such, the form involves conduit metaphor, where words, ideas, or other abstract aspects of communication are conceptually treated as objects that can be sent or received (Reddy 1979; Lakoff & Johnson 2003).

It should not come as a surprise that three of the forms in this category, i.e. GO1, GO2, and LEAVE are spatial verbs. The primary semantic characteristic of these verbs is that they indicate movement, which is essentially the only property that is iconically represented in category V forms.

In the subsections above, I have shown 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, on the other hand, the iconic mapping involved is much less specific; this is reflected in Table 4.20.[14]

Tab. 4.20: Iconic mapping for category V agreement verb forms.

ARTICULATORS	SOURCE
Handshape: various	-
Movement: directional	*X* goes from the initial location in the direction of the final location
Location: A location	
Location: A location	

4.6 Conclusion

In this chapter, I have identified iconic mapping patterns that recur across DGS verb forms. Many verb forms involve iconically motivated handshapes, which represent properties of the participant(s) of the event denoted by the verb. Some handshapes make iconic reference to two (or even three) event participants, while others reference only one. It should be noted that the valency suggested iconically

13 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.

14 It should be noted that the hybrid form TELL3 does have a more specific iconic mapping for one of the locations, since it has a fixed initial place of articulation on the body of the signer mapping onto the body of a referent. This mapping is not represented in Table 4.20.

and the actual valency of verb forms do not necessarily have to align; that is, iconicity does not necessarily determine the morphosyntactic behavior of verb forms, but there is likely to be a correlation. Further research is required to establish how strong this correlation is; also see the chapters in Part III of this book.

While iconic handshape mapping patterns were found to recur across verbs of different types, the way in which they combine with location and movement specifications differs for each verb type. Body-anchored verbs are articulated on the body of the signer, and I showed that, depending on the iconic handshape mapping involved, the body may take on different roles in relation to the external environment. In neutral verb forms, iconically-motivated specifications for handshape and movement may enrich the interpretation of the default place of articulation of these forms at the center of the signing space. In some cases, it comes to represent the location of an agentive referent, while in other cases, it aligns with the location of an affected entity in addition to the manipulating entity. Finally, agreement and spatial verbs are characterized by a movement that iconically represents the physical or metaphorical movement of an event participant, properties of which are again frequently iconically referenced in the form's handshape.

In conclusion, the present study has taken a step toward a more precise characterization of the recurring iconic properties of verb forms of different types in a sign language, thus furthering our understanding of the role of iconicity in the relation between verb semantics and verb type in DGS. Given that sign languages around the world display a considerable degree of overlap in terms of verb classification, it is expected that similar mapping patterns will be attested in other sign languages.

The next chapter connects the findings from the present and previous chapter to show that handshape can be associated with degree of transitivity, while verb type relates to the dimension of transitivity of lexical verb forms in DGS.

5 Synthesis: verb semantics

The previous two chapters have shown that body-anchored, neutral, and agreement and spatial verb forms have distinct semantic profiles (Chapter 3) yet at the same time frequently involve similar iconic handshape mappings (Chapter 4). In this synthesis chapter, I argue that verb type can be associated with dimensions of transitivity, while a form's handshape features are predictive of the degree of transitivity. To illustrate this point, the semantic maps from Chapter 3 make a return, leading to a comprehensive picture of the relation between verb form and verb semantics in German Sign Language (DGS), and likely other sign languages by extension.

5.1 Degree vs. dimension of transitivity

The semantic maps from Chapter 3.5 showed that the forms of each different verb type cluster together in different corners of Malchukov's (2005) transitivity map. Interestingly, this happens more or less along each of the three dimensions on the map: agreement verbs, including spatial verbs, are found most commonly in categories occuring in the upper dimension (categories ordered according to degree of patienthood of O), neutral verbs occur in middle dimension classes (referential distinctness), and body-anchored verbs prefer the lower dimension (agentivity of A; affectedness of O).

Now, recall that the three main verb types in DGS, as in other sign languages, can be distinguished from one another based on their location specifications, while movement features additionally distinguish agreement verbs (including spatial verbs) from body-anchored and neutral verbs. Thus, we may say that *verb type* can be associated with different *dimensions of transitivity*.

What about iconic handshape mappings? The results in Chapter 4 show that handshape is frequently motivated iconically in DGS verb forms. Two basic observations regarding handshape mappings could be made: (i) for each verb type, various iconically-motivated handshape mappings were attested, and (ii) most iconic mapping strategies were attested for at least two verb types. As such, it is evident that handshape is not predictive of verb type. However, different verb types have preferences for somewhat different types of iconic handshape mappings, and, more crucially, handshape interacts with movement and location specifications in different ways for different verb types.

Handshape specifications in verb forms typically represent properties of one or more participants in the event denoted by the verb (see Meir et al. 2007 for a

https://doi.org/10.1515/9783110742787-005

similar point). That is, some handshape types, such as handling and instrument handshapes, make iconic reference to two different event participants, whereas others, like whole-entity and body-part handshapes, iconically represent properties of just a single event participant. In other words, it appears that *handshape* in lexical verb forms can be associated with the *degree of transitivity* of an event.[1] In this chapter, this idea is investigated further with the aid of the semantic maps from Chapter 3.

5.2 Back to the semantic map

In the following subsections, verb forms are again placed on Malchukov's (2005) semantic transitivity map in order to further explore the possible relation between verb type, iconic handshape mappings, and transitivity semantics. The prediction is that lexical verb forms with handshapes iconically representing properties of multiple referents tend to represent verb meanings from categories toward the left, more transitive, side of the semantic transitivity map, while those with handshapes iconically referencing just a single entity cluster together on the right, more intransitive, side. The results are discussed per verb type, starting with body-anchored verbs.

5.2.1 Body-anchored verbs

As discussed in Chapter 4.3, virtually all body-anchored verbs (barring two exceptions) have in common that the body maps onto the body of an event participant. At the same time, I showed that the body is not involved in the event denoted by the verb in the same way across categories. Body-anchored forms characterized by a handling handshape, for instance, iconically map the signer's body onto an event participant affected by the action performed by the hand(s). To give a concrete example, the body-anchored verb EAT2 (see Figure 4.2 in Chapter 4.3.2) iconically represents the act of putting food into one's mouth. The verb's movement – a small straight movement toward the mouth – underscores that the signer's body, being on the receiving end of the action performed by the signer's hand, represents an affected entity. Thus, the iconically motivated handshape in EAT2 can be associated

1 This proposal also fits nicely with the large body of work showing that there is a clear relation between transitivity and classifier handshapes in sign languages (a.o. Glück & Pfau 1998; Benedicto & Brentari 2004; Grose, Wilbur & Schalber 2007; Ferrara 2012; Pavlič 2016; de Lint 2018; Kimmelman, Pfau & Aboh 2019; Kimmelman et al. 2019).

with a high degree of transitivity, with the body of the signer taking on a relatively patientive role.

In contrast, in body-anchored forms in which the signer's hand(s) map(s) onto a body part, such as LOOK-AT1 (Figure 4.5, right), the role of the signer's body in the denoted event changes: it becomes more like an experiencer. The handshape mapping involved can be associated with a lower degree of transitivity, and the body of the signer becomes less patientive and – by virtue of the iconically motivated body-anchored place of articulation – more experiencer-like.

I already revealed in Chapter 4.3 that the different mapping categories I distinguish for body-anchored verbs are not ordered randomly, but are organized in such a way that categories I to VI (category VII includes the two exceptions that lack clear form-to-meaning mappings) form a continuum that reflects the different degrees of involvement of the body versus the external environment. We can now make this general observation more concrete: the continuum reflects an ordering in which body-external factors are less prominently reflected in the handshapes used, having the simultaneous effect of increasing the prominence of the signer's body, which in turn becomes increasingly more experiencer-like. Thus, we may predict that body-anchored verb forms representing aspects of both the body and the external environment are more likely to occur toward the 'transitive' side of the semantic map, while verb forms in which the signer's body is particularly prominent would appear more often in categories toward the 'intransitive' side.

Figure 5.1 displays the same semantic map for body-anchored verbs from Chapter 3, but with added labeling to reflect the different verb form categories. 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.[2] In this context, it is also worth noting that at the lower end of the continuum we witness more forms – particularly psych-verbs – that involve metaphor or metonymy. This observation fits well with the notion that body-internal experiences, such as emotions, are inherently more abstract. Use of metaphor is a way to more clearly delineate such experiences (see e.g. Lakoff & Johnson 2003).

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 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 5.1 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 chapter already discussed the case of DIE2 and DIE3 in Chapter 4.3.1, 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 favored in contexts in which this referent is relevant. A detailed examination of this hypothesis falls outside the scope of this book, but may be explored in future work.

5.2.2 Neutral verbs

In Chapter 4.4, I pointed out that neutral verb forms can be divided into forms that iconically represent properties of two referents (category I-II) or just one (category III-V). 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 the semantic map, while verb forms of the other two categories would appear more

2 The only two non-iconic body-anchored verb forms (category I) are categorized 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.

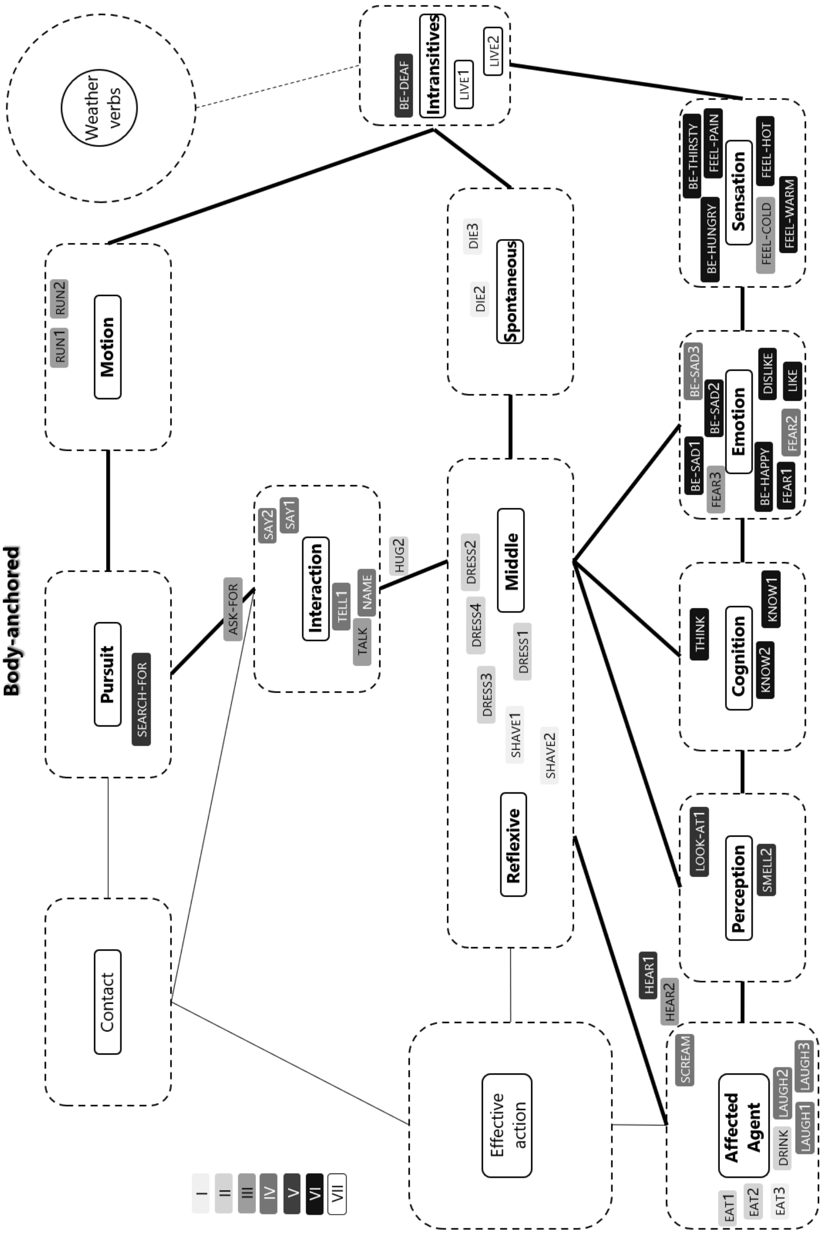


Fig. 5.1: The semantic map for body-anchored verbs, with shades of gray reflecting the different categories from the typology in Table 4.2 (Chapter 4.3). Legend: I. Instrument; II. Hand(s): holding; III. Hand(s): moving; IV. Body part: external expression; V. Body part: perception; VI. Body part: internal experience; VII. No iconic handshape mapping.

often in categories toward the 'intransitive' side. Figure 5.2 reproduces the semantic map with neutral verb forms from Chapter 3, with added distinctions made between different iconic mapping categories.

Like body-anchored verbs, neutral verbs also involve a variety of iconic handshape mappings. The interaction between handshape specifications and movement and location specifications makes that, overall, neutral verbs, iconically represent different types of events than body-anchored verbs do. The main difference is that the place of articulation of neutral verb forms – in citation form, the center of the signing space – is more abstract than the body in body-anchored verb forms. As such, the iconic mappings associated with the hands automatically become more prominent. This means that in forms with handling or instrument handshapes, the participant that the signer's hands make reference to is highly prominent iconically, while properties of other participants are only indirectly referenced. To give an example, the form BREAK (see Figure 4.9 in Chapter 4.4.2) is articulated with two handling handshapes (fists) making a snapping motion. The 'breaker' is clearly foregrounded iconically, while properties of the event participant undergoing the breaking are merely indirectly represented: the configuration of the hands suggest that it must be a relatively thin, elongated object. The iconic foregrounding of the acting event participant and backgrounding of the undergoing event participant fits with the description of a prototypical transitive event in which an action carries over from one participant to another (Hopper & Thompson 1980).

Indeed, category I verbs with instrument handshapes and category II forms with handling handshapes all cluster together in and around the 'Effective action' class – the class associated with the highest degree of transitivity – on the left side of the map. 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.[3]

In contrast, with the exception of the forms BOIL and BURN, category III and IV 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

3 An 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 Chapter 7.3 for a discussion of valency patterns with neutral verb forms.

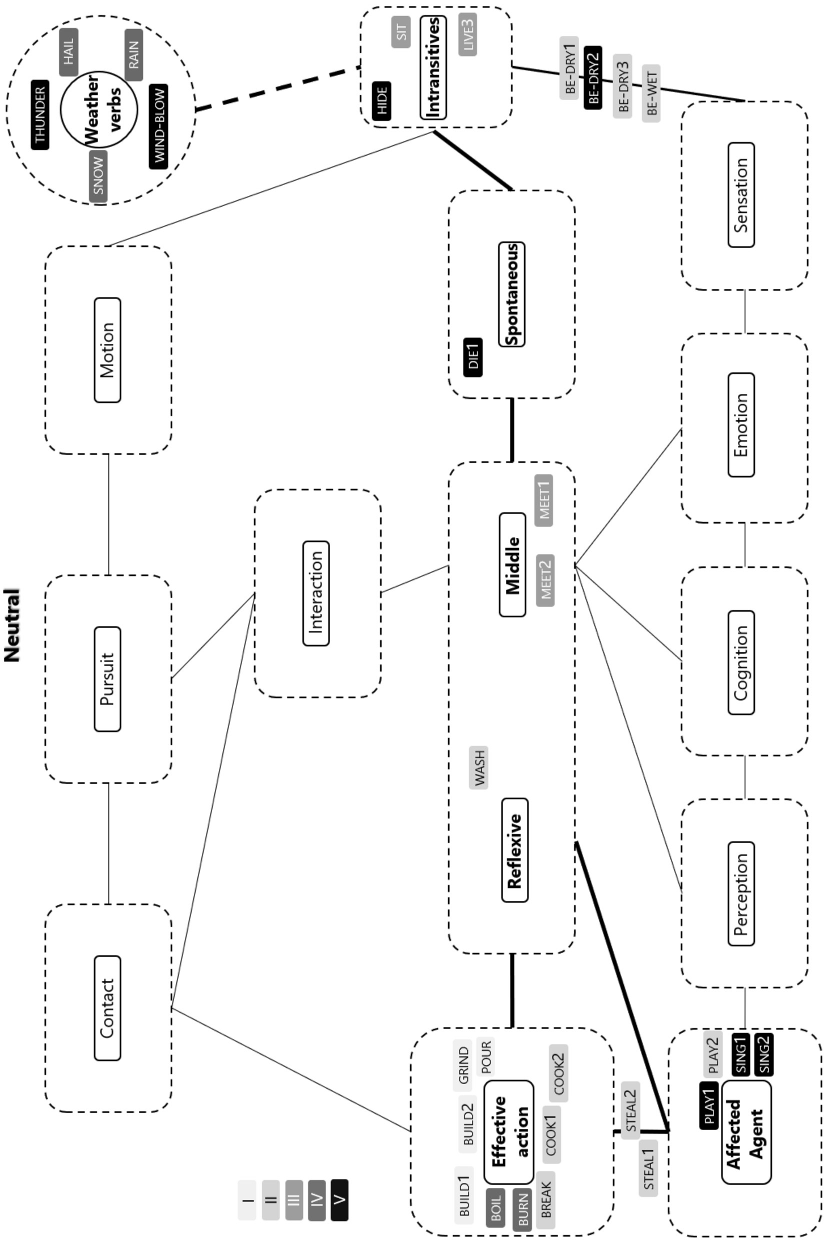


Fig. 5.2: The semantic map for neutral verbs, with shades of gray reflecting the different categories from the typology in Table 4.9 (Chapter 4.4). Legend: I. Instrument; II. Hand(s): holding; III. Body part / whole entity (human); IV. Whole entity (object); V. Iconic movement.

at the center of the map. It is also noteworthy that many category III and IV neutral verb forms possess relatively abstract properties. It seems appropriate that a high degree of abstractness would correlate with a relatively low degree of transitivity, and indeed, many of the relevant verb forms denote e.g. stative or non-agentive events.

Finally, neutral verb forms of category V 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 V forms.

In conclusion, the map in Figure 5.2 shows that a correlation between iconic handshape mappings and transitivity can also be detected for neutral verb forms.

5.2.3 Agreement and spatial verbs

Finally, for agreement verbs (including spatial verbs), I argued that the path movement characteristic of these forms iconically maps onto a directional movement from one location to another, with the iconically motivated handshape mapping providing iconic clues about the entity that moves. As with neutral verbs, one event participant is clearly foregrounded in agreement verbs forms, which is the participant that is iconically represented by the handshape. However, the directional movement ensures that agreement verbs make iconic reference to different types of actions, i.e. ones that involve the physical or metaphorical movement of an entity between two locations. Thus, agreement verbs involve a general iconic mapping in which an event participant moves from one location to another, where handshape type may once again offer additional iconic clues about the kind of event participant(s) involved. Figure 5.3 reintroduces 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.

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

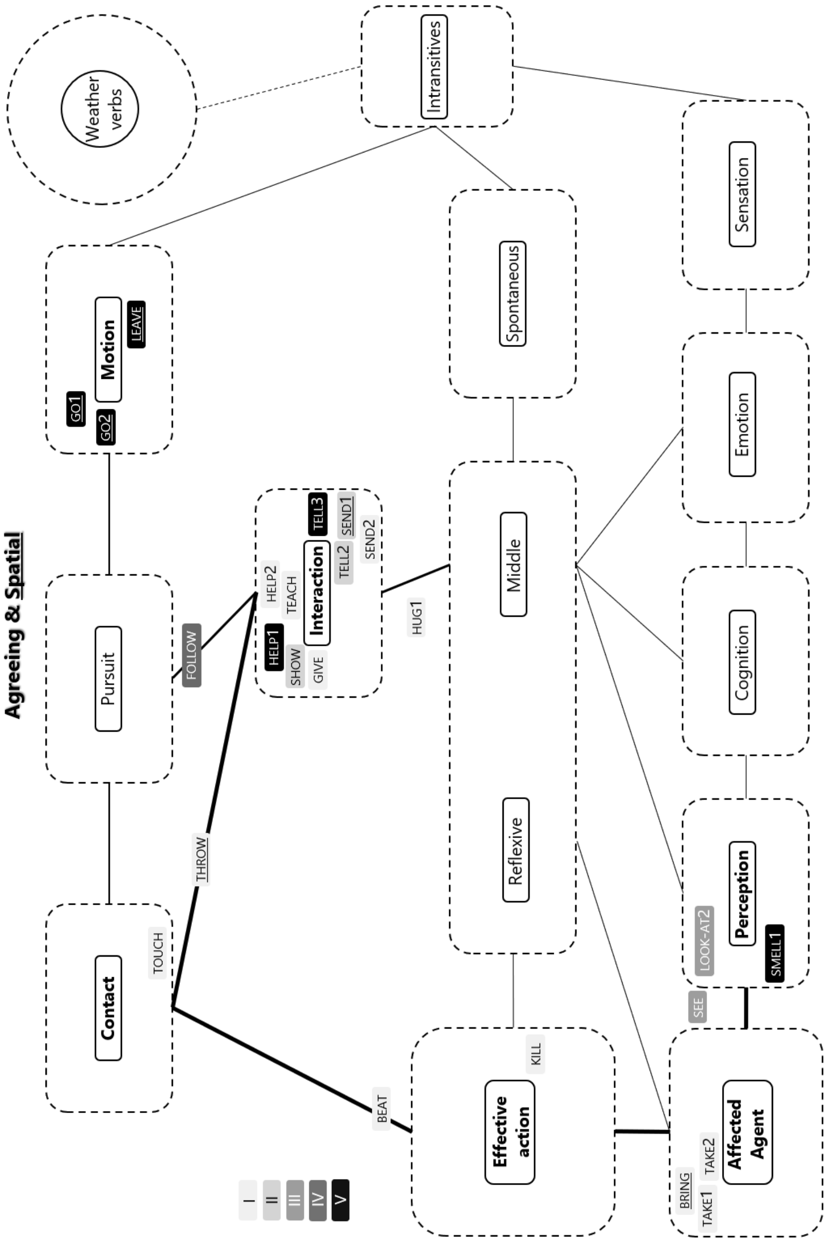


Fig. 5.3: The semantic map for agreement and spatial verbs verbs, with shades of gray reflecting the different categories from the typology in Table 4.15 (Chapter 4.5). Legend: I. Hand(s): holding; II. Hand(s): moving; III. Body part: perception; IV. Whole entity (human); V. Iconic movement.

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 Chapter 4.5.5, 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.

Thus, as with the other verb types, iconic mapping patterns in agreement verb forms are, to some extent, predictive of the semantic transitivity of individual verb forms.

5.3 Conclusion

Based on the discussion in the sections above, I conclude that iconic handshape mapping patterns correlate 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.

Of course, I should point out that this does not mean that iconic handshape mappings, or other iconically motivated properties of verbs of different types, *determine* transitivity. If that were the case, verb forms that make iconic reference to two event participants must necessarily be used exclusively in transitive constructions. It seems unlikely that this would be the case. In the chapters in Part III of this book, I scrutinize the morphosyntactic properties of body-anchored, neutral, and agreement and spatial verb forms; indeed, the findings will clearly show that the relation between iconicity and argument structure is correlational, not deterministic.

Part III: **Morphosyntactic properties of verb forms**

6 Body-anchored verbs

As first mentioned in Chapter 1.1.3, I make a distinction between two types of verbs that have typically been merged together under the label ‘plain verbs’ in the literature (but see Section 6.1). The distinction between what I refer to as body-anchored and neutral verbs 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 and iconic mapping analyses presented in Part II provided support for maintaining the distinction: body-anchored verbs and neutral verbs denote very different semantic concepts, and involve different iconic mappings.

In this chapter, I investigate the morphosyntactic properties of body-anchored verb forms in German Sign Language (DGS). Neutral verbs are discussed in the next chapter. The two chapters, as well as Chapter 8 on agreement and spatial verbs, adhere to the same general structure in order to facilitate systematic comparison (see Chapter 9).

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 6.1. I then discuss the constituent order (Section 6.2), valency (Section 6.3), and subject-drop patterns (Section 6.4) in the body-anchored verb constructions identified in the corpus data analyzed for this research. Section 6.5 concludes.

6.1 Background

There appears to be some disagreement in the literature regarding which verbs should be defined as ‘plain’ in sign languages. 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”. Padden (1988, 1990) notes that (some) such forms have the capacity to be spatially modified for location, analyzing this kind of localization as a pronoun clitic. However, others argue that localization is actually a form of agreement with a single internal argument (Van Gijn & Zwitserlood 2006; Costello 2015). I postpone a more detailed discussion of this phenomenon until Chapter 7, but let me point out here that these observations

https://doi.org/10.1515/9783110742787-006

have perhaps led Padden et al. (2010: p. 571) to claim that all plain verbs are, in fact, “anchored to the body”.[1]

In this book, 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.

6.1.1 Body as subject

Based on data from two sign languages, 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 the hands may represent various other facets of the event denoted by the verb.[2] Consider the iconic sign EAT, for instance, which happens to be identical in form in both ISL (discussed in Meir et al. 2007) and DGS (Figure 6.1).

Fig. 6.1: A token of EAT1.

1 It 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).

2 In Section 4.3, I present a close examination of the event properties that the hands may iconically represent in body-anchored verb forms.

Meir et al. (2007) decompose EAT 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 (also see Chapter 4.1), the authors schematize these form-to-meaning mappings in a table, reproduced here as Table 6.1.

Tab. 6.1: Iconic form-to-meaning mapping of EAT in ISL, reproduced from Meir et al. (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

Three of the meaning components in Table 6.1 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 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; the apparent fact that – contra to what can be observed in spoken languages – objects appear to be more frequently and consistently marked than subjects in sign languages (see e.g. Meier 1982; Bahan 1996; Liddell 2003; 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 an agreement system 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, Salzmann & Steinbach (2018) have argued that a number of verbs in DGS have undergone a similar process of change.

6.1.2 Psych-verbs in NGT

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, Zwitserlood & Ros 2008), I described general argument-structure patterns of psych-verb constructions, and 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 6.2a) or to a type of behavior associated with the expression of an emotion (e.g. SURPRISED; Figure 6.2b), on the one hand, and verb forms where the hands represent either the hands or the legs (e.g. NERVOUS; Figure 6.2c), on the other. In none of the cases is the body-anchored articulation random or coincidental; it is always iconically motivated.

(a) LOVE **(b)** SURPRISED **(c)** NERVOUS

Fig. 6.2: Three body-anchored psych-verbs in NGT (Oomen 2017: p. 70).

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 (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.

(1) a. INDEX$_1$ **LOVE** LIVE INDEX$_1$ [NGT]
'I love life.'
b. ONE $\overline{\textbf{AFRAID}}^{\text{rs}}$ [NGT]
'One [of them] was afraid.'
c. INDEX$_1$ **AFRAID** DRIVE-CAR [NGT]
'I was afraid of driving a car.'

I found subject drop to occur frequently in the dataset: of the 133 constructions with a psych-verb and a subject Experiencer that were analyzed, 72 involve a null subject.[3] This observation in itself is hardly surprising, given that sign languages frequently allow for their arguments to be dropped (see Section 1.1.5). 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.[4] 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 6.2, 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.

Tab. 6.2: (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*

Person	No rs	Rs
First	30	9
Third	17	5

(b) *Null subjects*

Person	No rs	Rs
First	27	17
Third	**1**	27

3 Clauses that also included a Theme/Stimulus argument were not analyzed for subject drop.
4 There were no examples with second person subjects in the NGT data.

In informal terms, I proposed that body-anchoring of psych-verbs yields a default first-person interpretation in the absence of an overt subject.[5] 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 – 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 6.4 if the DGS corpus data provide evidence in support of these hypotheses.

6.2 Constituent order patterns

DGS has generally been claimed to have basic SOV order (e.g. Happ & Vorköper 2006; Herrmann 2013), although there may be all sorts of factors at play that could influence this word order. One of those factors could be verb type: Napoli & Sutton-Spence (2014) have shown in many sign languages, verb forms that cannot be modified to express agreement tend to prefer SVO over SOV order. In this section, I investigate the constituent orders of constructions with body-anchored verb forms in the data set.

Before discussing the analysis, I should explicate a number of points concerning the data annotation process. Recall from Chapter 2.3.2 that annotations representing constituent order were made for every example in the corpus data. Different types of verbs and predicates, arguments, modals and auxiliaries were 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, information on role-shift boundaries was included in the analysis.

As for prosodic boundaries, sentences with identical constituent orders apart from the presence vs. absence of a prosodic boundary, as in (2a) vs. (2b), are collapsed into a single category whenever the boundary precedes or succeeds a

5 In Oomen (2017), I also present a formal account of this phenomenon; this analysis is detailed in Chapter 11.1.1.

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.

(2) a. INDEX$_2$ **KNOW2** \ FOURTEEN$_a$ FOURTEEN$_b$ INDEX$_2$ BONUS OBTAIN
'You know you can get the 14/14 bonus for it.' [koe05-B-02:30.45]

b. INDEX$_1$ $\overline{\textbf{KNOW2}}^{\text{hs}}$ 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 in the analysis below. That is, I only consider the relative ordering of verbs, arguments, modals/auxiliaries, and boundaries.

Also 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 below), 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 et al. 2009).[6] Similarly, there is not much on the surface to suggest that locative objects as in (3a) differ from regular objects as in (3b) 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.[7]

6 To 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).

7 Unfortunately, the data with body-anchored verbs do not contain enough examples with locative objects to assess this hypothesis. However, see Chapter 7.2 and 8.2 for discussions on constructions with locative constituents and neutral or agreement verbs.

(3) a. POSS$_1$ PARENTS **LIVE1** INDEX — S V O/Loc
‘My parents lived there.’ [fra05-B-02:01.35]
b. INDEX$_1$ **SEARCH-FOR** EXPENSIVE FAX — S V O
‘I searched for the most expensive fax machine.’ [lei08-B-02:35.65]

Finally, main and dependent clauses could have different constituent order preferences and were therefore separated for the analysis. Due to the relative paucity of dependent clauses with body-anchored verbs in the data set (N=65), only main clauses (N=494) are discussed below.

In those 494 main clauses with body-anchored verbs, a huge variety in constituent orders was attested, with many orders occurring just once. In total, 100 different constituent orders were attested in the data set. 60 orders were attested once, while 17 orders occurred twice; these are not further discussed. Table 6.3 lists all constituent orders that occurred three times or more. For a legend of the annotation labels, see Chapter 2.3.2.

Tab. 6.3: 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		

As can be observed from Table 6.3, S V is by far the most frequently attested order: it occurred in 86 out of 494 main clauses with body-anchored verbs (17.4%). In addition, S V constructions with role-shift markers accompanying the verb or both the subject and the verb were attested 37 (7.5%) and 18 (3.6%) times, respectively. Examples demonstrating these three patterns are presented in (4). Remember that elements such as adverbs or negative particles are not considered in the analysis, but they may be part of the examples (like NOT in (4a)).

(4) a. INDEX$_1$ **LAUGH1** $\overline{\text{NOT}}^{\text{hs}}$ — S V
‘I couldn’t laugh about it.’ [koe09-B-01:00.80]

	b.	INDEX$_1$ $\overline{\textbf{SCREAM++}}^{rs}$	S [V]
		'I was screaming.'	[stu18-B-01:40.80]
	c.	$\overline{\text{INDEX}_1\ \textbf{RUN2++}}^{rs}$	[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 (5a), 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 (5b).[8]

(5)	a.	**BE-DEAF** INDEX$_a$	V S
		'He was deaf.'	[koe11-A-05:28.00]
	b.	$\overline{\text{INDEX}_2\ \textbf{KNOW1}\ \text{INDEX}_2}^{re}$	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; (6a)) and 4.5% (with role shift; (6b)) of the data. These examples lack (at least) an overt subject. For a description of subject-drop patterns in the data, see Section 6.4.

(6)	a.	**BE-HAPPY**	V
		'[I] was really happy.'	[koe11-A-02:42.95]
	b.	$\overline{\textbf{TELL1++}}^{rs}$	[V]
		'[He] was always talking [about topics he liked].'	[stu13-B-11:41.95]

A total of 41 examples (8.3%) include 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 include the verbs SAY1, SAY2, KNOW1, KNOW2, and THINK (see Section 6.3; two examples are provided in (7a) and (7b).

8 All examples with S V S order are declarative sentences except (5b), which is an interrogative.

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

Objects were not all too commonly attested. The most frequent order that includes an object is S V O (8a) with 17 counts (3.4%), followed by V O order with 11 occurrences (2.2%), and O V with five counts (8b). A total of 11 examples, all including the verb form LIVE1 and with a variety of constituent orders, include an object-like locative argument (8c). Other orders, such as S O V and O \ S V, occur but in lower numbers. In fact, many of the constituent orders that occurred 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 6.3, a total of 95 (19.2%) body-anchored verb constructions include an overt object.

(8) 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. INDEX$_1$ **LIVE1** NOW $\overline{\text{NOT CITY}}^{\text{hs}}$ 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 were also attested with some regularity (N=29; 36.3%). However, 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) has argued that DGS does not have fixed constituent order, claiming it to be unnecessary because argument roles are indicated either on the verb in the case of agreement 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, leading to PAM being inserted to "morphologically repair the lack of agreement" on the verb. The constraints he refers to include body-anchoring as well as motor constraints.[9] Regarding the use of PAM, the corpus data suggest a different story: the auxiliary is hardly ever attested (see Chapter 11.4.2 for a brief discussion), yet there are many clauses with body-anchored verbs that denote transitive concepts. Two such constructions are presented in (9a) and (9b). 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.

(9) a. $\overline{\text{THEN YOUNG}}^{\text{fr}}$ \ $\overline{\textbf{KNOW1}}^{\text{hs}}$ O \ V
'The younger one, [I] don't know.' [koe20-B-03:57.90]
b. INDEX$_1$ **SEARCH-FOR** ALWAYS CERTAIN BOOKS S V O
'I would always search for certain books.' [mst10-B-05:40.00]

As pointed out before, for a number of sign languages that show an SVO preference in clauses with plain (i.e. body-anchored) verbs, it has been suggested that SVO must be the basic constituent order, as plain verbs are assumed to involve 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 in contradiction to previous reports that DGS has basic SOV order (Steinbach & Herrmann 2013; Pfau & Glück 2000; Bross & Hole 2017). However, I will argue in Chapter 11 that body-anchored verbs in DGS do morphologically agree with their subjects, such that the argument above no longer applies. In Chapter 11.4.1, I put forward a different (tentative) proposal concerning basic constituent order in DGS.

6.3 Valency patterns

This section describes valency patterns in clauses with body-anchored verbs. First, a word of caution: while corpus data can reveal which constructions are possible in

9 In 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 6.1, 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 6.4.

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 11.4.5.

The verb forms BE-THIRSTY, DIE3, SMELL2, SAY2, EAT1, EAT3, SHAVE1, SHAVE2, and all four forms of DRESS are excluded from analysis because they are represented by four or fewer tokens in the data set.[10]

Firstly, a fair number of body-anchored verbs are intransitive, with an optionally null subject (see Section 6.4). Verbs of sensation, such as FEEL-COLD (10a) and FEEL-PAIN (10b), for instance, are exclusively attested in intransitive constructions.

(10) a. $\overline{\text{INDEX}_2\ \textbf{FEEL-COLD}}^{\text{rs, re}}$ [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 only used intransitively in the corpus data include verbs of non-verbal expression (SCREAM, LAUGH1, LAUGH2 (11a), and LAUGH3), the adjectival predicate BE-DEAF, the activity verbs RUN1 (11b) and RUN2, and the verb form DIE2 (11c). Note that the lexical forms for DIE2 and DIE3 (fewer than four tokens), 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, both 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 was judged ungrammatical.

10 The 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]

(11) 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]

LOOK-AT1 is another verb that occurs only with a subject in the clause. As I discussed in Chapter 3.5.5, 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 propose 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 (12).[11] 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.

(12) a. INDEX$_1$ $\overline{\textbf{LOOK-AT1}_a}^{\text{rs}}$ \ $\overline{\text{YES SERIOUS INDEX}_1 \text{ PU}}^{\text{rs}}$ S [V] \ [V]
'I realized it was serious.' [hh03b-A-02:40.40]
b. $\overline{\textbf{LOOK-AT1}_a}^{\text{rs}}$ \ $\overline{\text{MATCH INDEX}_1 \text{ INDEX}_a}^{\text{rs}}$ [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 have the capacity 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 (13) illustrate this alternation.[12]

11 LOOK-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".

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

(13) 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]

Some verbs of emotion can also occur in transitive constructions. LIKE and DISLIKE are examples of consistently transitive verbs. Example (14a) is a sentence in which both arguments are overt, but subject and object can also be dropped: (14b) includes only a subject, (14c) includes only an object, and (14d) does not include either argument. Still, in each case, the dropped argument(s) can be recovered from the context.

(14) a. INDEX_1 **LIKE** SPORT INDEX_a — S V O
'I like sports.' [goe01-A-00:01.00]
b. $\overline{\text{INDEX}_a\ \textbf{LIKE}\ \text{NOT PU}}^{\text{hs}}$ — 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. $\overline{\textbf{LIKE}\ \text{NOT}}^{\text{hs}}$ — V
'[I] don't like [the potatoes too dry].' [hh01-A-06:27.25]

Other verbs of emotion were also attested in transitive constructions, but were more frequently used intransitively. While clauses with LIKE included an overt object in 25 out of 30 cases, for instance, constructions with BE-HAPPY included an object in just 8 out of 20 cases. Moreover, most of these objects are clausal complements, as in (15a). Indeed, although in some cases, the immediate context is explicit about the source of happiness (15b), in other cases, no cause or stimulus is mentioned in the context, suggesting that it is not deemed relevant (15c). The forms BE-SAD1, BE-SAD2, BE-SAD3, and FEAR behave in a similar way to BE-HAPPY.

(15) a. INDEX_1 **BE-HAPPY** PARENTS BIRTH GERMAN — S V CO
'I'm glad my parents were born in Germany.' [mst12-A-03:42.40]
b. $\overline{\text{LEAVE}}^{\text{re}}$ \ **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]

These 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 emotion verbs LOVE, HATE, and MISS are obligatory in NGT, although they may be expressed by a null object. In contrast, with verbs such as BE-ANGRY, BE-PROUD, and BE-AFRAID, objects can be absent in the semantic representation completely. The data suggest that there is a similar split in DGS, as reflected by the proportion of clauses that include an object with verbs such as LIKE vs. verbs such as BE-HAPPY.

KNOW1, KNOW2, THINK – all verbs of cognition – can also take objects. KNOW2 and THINK tended to occur with a clausal complement, as in (16a) and (16b), while KNOW1, which is often used with the meaning of knowing *people*, usually occurred with a nominal object (16c).[13]

(16) a. BUT $\overline{\textbf{KNOW2}}^{hs}$ \ HOW-MUCH PERCENT EARTHQUAKE \ $\overline{\textbf{KNOW2}\ \text{NOT}}^{hs}$ V [...] V
'But they didn't know how strong the earthquake was going to be.' [mst12-A-00:12.80]

b. INDEX$_1$ **THINK** \ CL-MOVE(✋):LOAD-ONTO S V \ CO
'I thought the car would be loaded onto the back of the lorry again.' [lei13-A-12:08.00]

c. $\overline{\text{ONE CHILD SCHOOL INDEX}_a}^{re}$ \ **KNOW1** INDEX$_1$ O \ V S
'I knew one kid from school.' [mst16-B-05:20.10]

LIVE1 and LIVE2 can select locative objects without any kind of additional marking. In (17), for instance, a regular pointing sign is used to refer to a location.

(17) INDEX$_1$ INDEX$_a$ $\overline{\textbf{LIVE1}\ \text{NOT}}^{hs}$ S O/Loc V
'I couldn't live there [in Japan].' [mst12-A-03:46.95]

NAME occurred in transitive constructions, with the entity being named as the subject and the name itself as the object, as in (18a) and (18b). The data set does not include any ditransitive constructions in which the name-giver is also included as an argument. The two DGS informants confirmed that such ditransitive con-

13 Note that (16a) is analyzed as a single sentence in which the complement clause is sandwiched in between the two parts of the main clause, in which KNOW2 is doubled. This analysis is based on prosodic cues: while use – or lack thereof – of the headshake signals clause boundaries at the indicated places, there are no clear cues that suggest that one of the boundaries is a sentence boundary.

structions are marked; they prefer constructions with addition of the verb GIVE to yield the phrase GIVE NAME.

(18) a. $\overline{\text{DEAF}}^{\text{'gehörlos'}}$ PARTY **NAME** $\overline{\text{DEAF}}^{\text{'taub'}}$ 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 – can occur in ditransitive constructions. In example (19a), 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 of what is said is represented in the clausal complement. In example (19b) with TELL1, ‘my mother’ is the teller, ‘me’ is the addressed referent, and the complement clause represents what is being told.

(19) a. INDEX$_a$ INDEX$_1$ **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. POSS$_1$ MOTHER$_a$ INDEX$_1$ **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 were all attested. Given that body-anchored verbs do not have the capacity 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 Russian Sign Language (Kimmelman 2018a).

6.4 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 representing information about the subject referent for each example in the data set. Specifically, it was indicated for each clause whether (a) the subject referent was first, second or third person; (b) the subject referent was plural; (c) the subject was overt or null, and (d) there was action role shift in the clause. With action role shift, the signer comes to represent the actions of a referent, such that there is a first-person interpretation of the subject within the context of a role shift.[14] 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 has a meaningful effect on the results.

Table 6.4 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.[15]

Tab. 6.4: (a) Overt and (b) null subjects in clauses with body-anchored verbs (N=556) in DGS; rs = role shift.

(a) *Overt subjects*

Person	No rs	Rs
First	175	36
Second	36	0
Third	135	17

(b) *Null subjects*

Person	No rs	Rs
First	105	14
Second	8	2
Third	**10**	17

Unremarkably, overt first- and third-person subjects freely occurred in clauses both with and without role shift. However, the results show a different pattern for non-overt subjects. While null first-person subjects occurred 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.[16] When there is action role shift, third-person subjects are more frequently null (N=17), especially considering that clauses with role shift (N=86) are attested much less frequently overall than clauses without (N=469). Since the subject in the local context of

14 Quotative 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.

15 Note that the numbers reported in Table 6.4 slightly differ from those reported in Oomen & Kimmelman (2019), even though the analyses in this book 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 & Kimmelman (2019). The cause of these slight divergences is that I conducted another annotation round after the publication of Oomen & Kimmelman (2019) to clean up some errors and inconsistencies in the annotations. The changes do not have any significant impact on the overall results.

16 See Chapter 9.4 for a statistical analysis of subject drop in clauses with body-anchored, neutral, and agreement verbs.

a construction with action role shift receives a first-person interpretation, 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 were still attested in a handful of cases. These exceptions to the hypothesis warrant an explanation. There seem to be several different factors at play here. Firstly, a couple of examples which received an annotation for a third-person non-overt subject might actually be better analyzed as impersonal constructions. For instance, the non-overt subject in (20a) 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, for some examples, it was not clear from the context whether the non-overt subject was first or third person. In (20b), the corpus translation implies a third-person subject and the context allowed 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 revealed that a pointing sign might actually have been present (i.e. the subject is overt), but its articulation was so rapid that it was difficult to observe (20c); see the video still in Figure 6.3. I thus conclude that there is sufficient evidence to support the prediction that non-overt third-person subjects in clauses with body-anchored verbs are ruled out.

(20) 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 INDEX$_1$ \ **BE-SAD3** INDEX$_1$
‘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]

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 be dropped in clauses with body-anchored verbs.[17]

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

Fig. 6.3: A video still showing the articulation of the index sign indicated in (20c).

The results in Table 6.4 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.[18] 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 (21). It thus appears that the default interpretation of null subjects in direct questions is always second person.

(21) $\overline{\textbf{KNOW2}\ \text{COFFEE FILTER}}^{\text{re}}$
'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; Hatch, Shapira & Gough 1978; Ferguson 1981). The three clauses in (22), 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 (Hatch, Shapira & Gough 1978; Ferguson 1981), it is possible that the repetition in the example licenses such drop. Alternatively, the characteristics of 'foreigner 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.[19]

18 Also 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.

19 However, 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

(22) $\overline{\text{INDEX}_2 \text{ HARD-OF-HEARING}}^{\text{qrs}}$ \ $\overline{\text{CAN } \textbf{HEAR1}}^{\text{qrs}}$ \ $\overline{\text{INDEX}_2 \text{ BAD } \textbf{HEAR1}}^{\text{qrs}}$
"'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 11.1.7 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. Chapter 11 presents a formal account of constructions in which the subject-drop patterns in clauses with verbs of different types play a central role.

6.5 Summary

In this chapter, I described the morphosyntactic properties of body-anchored verbs. With regard to constituent order, the results show that subjects tend to come before verb and (direct) object, while direct objects may occur before or after the verb, with a preference for postverbal position. I also discussed valency patterns in clauses with body-anchored verbs. The corpus data show that some body-anchored verbs are exclusively attested in intransitive constructions, others occur in (di)transitive sentences, 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 11.

to expect pointing to be ubiquitous in hearing-to-deaf talk, too. Viewed from this perspective, the construction in (22) would be somewhat unexpected.

7 Neutral verbs

This chapter offers 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, they are distinguished from body-anchored verbs, whose properties I have discussed extensively in Chapter 6, even though verbs of both types have traditionally been categorized as plain verbs.

Previous literature on neutral verbs in various sign languages is discussed in Section 7.1, where particular attention is paid to different perspectives on the localizing abilities of neutral verbs. Sections 7.2 to 7.5 discuss the morphosyntactic properties of neutral verbs in German Sign Language (DGS): constituent order, valency, localization properties, and subject-drop patterns are discussed in turn. Section 7.6 summarizes the chapter.

7.1 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 claimed that such spatial modification should be analyzed as a form of agreement, others have argued against that. Both perspectives are discussed in turn in Sections 7.1.1 and 7.1.2.

7.1.1 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 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).

https://doi.org/10.1515/9783110742787-007

(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 repetition (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-interated 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) INDEX$_1$ 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 DGS is best analyzed in terms of pronominal affixation. Unlike Padden, however, Keller claims that the modification of agreement verbs is also an affixation process. Motivation he offers for this approach is that agreement verbs do not mark agreement with grammatical roles, but 'agree' with locations associated with particular thematic roles, namely Source and Goal.[1] The only verbs 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.

7.1.2 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 & Gough (1978) on ASL, Bos (1993) and Van Gijn & Zwitserlood (2006) on Sign Language of the Netherlands (NGT), Meir (1998) on Israeli Sign Language

1 Meir (1998), in fact, makes similar observations for ISL but draws entirely different conclusions from them; see Chapter 8.1.2.2 for details.

(ISL), Costello (2015) on Spanish Sign Language (LSE), and Lourenço (2018) and Lourenço & Wilbur (2018) on Brazilian Sign Language (Libras).

Fischer & 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 & 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 & 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 agreement 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), and Lourenço & 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.[2] If the sentence in example (1) receives the interpretation in (1a) ('The woman$_\mathrm{i}$ is wanting and the man$_\mathrm{j}$ is wanting, too.'),

2 To 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.

Meir suggests that the construction exemplifies discourse agreement rather than syntactic agreement. Discourse agreement is suggested to mark a comparison or contrast, and referents are localized in contrastive locations to highlight this contrast between them. Often, the partitioning is marked non-manually 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, and also observes 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).

(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 agreement 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 & Wilbur (2018) are perhaps the most explicit advocates of an analysis that treats neutral and agreement 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.[3] Only three forms are not body-anchored yet resist localization: MAKE-EFFORT, BEG, and MEDITATE. However, Lourenço & Wilbur (2018) note that each of these forms is still articulated close to the body and is highly iconic in nature.[4] 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 11.3, I lay out my own view on 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 7.4, forms the basis for the analysis.

3 In 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.

4 In 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 4.3.3). 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.

7.2 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 6.2. Impersonal constructions are excluded from the analysis, as are nominal or adjectival uses of neutral verbs. In total, there were 195 clauses with neutral verbs in the corpus data. 146 of these are main clauses; the remaining 49 are dependent clauses. Only main-clause constructions are analyzed in this section.

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, I am 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 6.2 for a discussion of the implications of this methodological choice). Constituent types other than the ones just 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.

In total, 39 different constituent orders were attested in main clauses with neutral verbs (N=146). 23 of those orders occurred just once in the data. Table 7.1 lists all constituent orders that were attested twice or more.

Tab. 7.1: 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 containing body-anchored verbs, the most common constituent orders in neutral-verb constructions were S V (N=42; 28.8%) and V (N=31; 21.2%).

Clauses with a verb only can be assumed to involve subject drop except in the case of a weather verb (see Section 7.3). Subject-drop patterns are discussed in Section 7.5.

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, the 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. In other words, 94 (64.4%) of the 146 main clauses with neutral verbs have (S) V order. These numbers suggest a preference for simple clauses that lack an overt object.[5] Some examples of clauses illustrating S V, [V], and S [V] order are presented in (5).[6]

(5) a. INDEX$_a$ STRONG **PLAY2** — S V
‘They played extremely well.’ — [mst04-A-01:30.50]

b. $\overline{\textbf{BUILD1}}^{\text{rs}}$ — [V]
‘[The craftsmen] were building.’ — [hh04-B-05:41.60]

c. INDEX$_1$ $\overline{\text{BE-BORED}}^{\text{rs}}$ \ INDEX$_1$ $\overline{\textbf{SIT}_1}^{\text{rs}}$ — S [V] \ S [V]
‘I was bored. I was just sitting around.’ — [fra05-10:54.35]

Few of the examples represented in Table 7.1 included a direct object. Of those that do, it is worth noting that in all nine cases, the object preceded the verb. When the examples with constituent orders that occurred just once in the data are also included, this pattern is preserved: OV order occurred a total of 14 times in the data, while VO order was attested just once. I should note that in three of these 14 examples with OV order, there was a clear prosodic break between the object and the verb, which may signal topicalization.[7] These results contrast with those for clauses with body-anchored verbs, which showed a preference for postverbal objects (41 vs. 29 examples; see Chapter 6.2).

Two examples with neutral verbs and an S O V order are presented in (6). 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.

5 Of course, it is still possible that some of these verbs mark their object through modification of the verb’s place of articulation. Localization is the topic of discussion in Section 7.3.

6 Example (5c) 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 7.3 for more discussion.

7 Two sentences involve doubling of either the object or the verb; these examples were excluded from the count.

(6) a. OFTEN ALL SUNDAY INDEX$_1$ $\overline{\text{POINT PLAY1}}^{\text{'punktspiele'}}$ **PLAY2** S O V
'I often played league games every Sunday.' [koe13-A-04:15.40]

b. INDEX$_1$ ONCE SAUCE **COOK2** S O V
'I once cooked some kind of sauce.' [hh01-A-05:21.90]

Table 7.1 includes one order with a constituent labeled 'O/S' (O/S V; N=3), and several other clauses whose constituent order occurred only once include the labels 'S/O' and/or 'O/S'. These labels were used in clauses with the symmetrical verbs MEET1 and MEET2 to reflect the reciprocal relation between the participating arguments. In general, if there were two arguments present in a clause with MEET1/2, the first was labeled S/O and the second O/S, as in (7a). In cases where there was 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 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 (7b), where the overt argument in the second clause is more like an object.[8] Finally, a couple of examples included one argument representing both referents participating in the event denoted by the verb. An example is (7c), in which the signer first signed the participating referents individually, and then used the pronominal INDEX$_{1pl}$ to represent both event participants simultaneously. As it happens, the verb MEET1 did not show alignment between the initial places of articulation of the hands and the loci of the individual referents.

(7) a. $\overline{\text{INDEX}_2\ \text{INDEX}_1\ \textbf{MEET1}\ \text{INDEX}}^{\text{re, rs}}$ S/O O/S V O/Loc
"'Shall you and I meet there?"' [lei08-A-12:31.95]

b. INDEX$_1$ 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. INDEX$_1$ 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]

8 Subscripts 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 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 could potentially be analyzed as locative arguments. Two examples with locative constituents were already presented in (7a) and (7c); another is displayed in (8).

(8) EVENING TOGETHER **SIT** CL():TABLE V O/Loc
'We sat at the table at night.' [goe03-A-06:32.30]

The preferred order for O/Loc constituents vis-à-vis the verb is V O/Loc (N=9), while just three examples exemplified O/Loc V order.[9] 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 7.3.

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.

7.3 Valency patterns

This section discusses valency patterns in clauses with neutral verbs. As a general note, I should remind the reader that corpus data cannot provide negative evidence. As such, it is possible that a verb is described 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 occurred rather infrequently in the data, are analyzed as a group. For some verbs for which certain argument-structure alternations appeared likely yet were unattested (or attested only once or twice) in the corpus, I discussed the grammaticality of different sentence constructions with two DGS informants. Whenever I did so, it will be mentioned in the text.

9 In one additional example, two copies of O/Loc respectively precede and succeed the verb.

Firstly, weather verbs (RAIN, WIND-BLOW, SNOW, HAIL, THUNDERSTORM) never occurred with overt arguments in the data set (9). In (9a), three different weather verbs are separated by a conjunction and a palm-up sign, which serve as manual clause boundaries. In (9b), 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 included an (expletive) argument, which makes them what can be called 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, Kittilä & Kolehmainen 2012; Salo 2011).

(9) 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 (10). (10b) 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 two DGS informants whether BURN could also occur in transitive constructions such as INDEX$_1$ 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 may sometimes use BURN transitively, but younger signers generally would not.

(10) a. HUMAN$_a$ **DIE1**$_a$ S V
‘Many people died.’ [koe09-B-01:05.10]
b. dh: INDEX$_a$ CL():plane CL():fly-into \ STILL **BURN**
ndh: CL():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 (11). Kimmelman (2018a) analyzes such constituents as objects in his study on argument-structure patterns in Russian Sign Language (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, which he considers sufficient reason 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 7.2, the former tend to precede verbs, while the latter tend to follow them, as in (11a). 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.[10]

(11) a. INDEX$_1$ **LIVE3** AACHEN — S V O/Loc
'I was living in Aachen.' — [koe11-A-01:47.20]
b. INDEX$_1$ **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 (12). While it is possible that these examples involve subject drop of an agentive argument, such an analysis seems implausible for a sentence like (12), 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'.

(12) WEATHER $\overline{\textbf{BREAK}}^{\text{'kaputt'}}$ — S V
'The climate is broken.' — [mst10-B-04:52.90]

Just one clause with BREAK seemingly includes an agentive subject (13), 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.

10 I 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 described in Chapter 2.3.

'verletzt'

(13) SECOND LIST.OF.4:2 PERSON ALREADY BIT **BREAK** LEG S V O
'The second runner had injured their leg a little.' [koe18-A-04:08.10]

In their seminal work on classifier predicates in ASL, Benedicto & Brentari (2004) 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 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 handshape () in unaccusative constructions.

However, on the tentative conclusion that clauses such as (12) do not involve a null or impersonal subject, it is evident that the use of a handling handshape 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 INDEX$_1$ 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 marginally acceptable by this signer, who preferred the use of a classifier predicate that more accurately reflects the way a window breaks.[11] However, the same sentence was judged perfectly grammatical by the other informant, who indicated that he interpreted the sentence WINDOW BREAK 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 (cf. Levin 1993).

COOK1, COOK2, and BOIL may all occur in transitive constructions.[12] It seems that BOIL obligatorily takes a patientive direct object, as in (14c) and (14d), while COOK1 and COOK2 may participate in the unspecified-object alternation. That is, if a signer wishes to convey the general act of cooking, there is no direct object (14a), otherwise, there may be a (null or overt) object in the sentence referring to the

11 Nonetheless, the informant also remarked that BREAK could in principle be used in any possible context which involves a breaking event.

12 I should point out that almost all tokens of these three forms (22/25) occurred within one and the same dialogue.

substance being cooked, as in (14b) and (14d). Note that (14d), which represents an enumeration of activities, includes both the verbs COOK1 and BOIL; COOK1 does not take an object, but BOIL does (COFFEE).

(14) a. INDEX$_2$ CAN **COOK2** S Mod V
'You can cook.' [hh01-A-02:31.95]
b. INDEX$_1$ FOOD **COOK1** S O V
'I [wanted to] cook a meal.' [hh01-B-00:00.50]
c. INDEX$_1$ **BOIL**$_a$ POTATO$_a$ \ INDEX$_1$ HATE$_a$ # S V O
'I hate cooking potatoes.' [hh01-A-03:13.95]
d. INDEX$_1$ 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 (15), 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 (15) – '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.

(15) $\overline{\textbf{BOIL}}^{\text{re}}$ \ 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 (16a) and (16b) (the latter contains a null object).[13] In some cases, a single pronoun (e.g. 'we') or a collective noun (16c) refers to all participants in the reciprocal event with

13 Double subscripts preceding instances of MEET1 and MEET2, as in (16b) and (16d), 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 7.4.

a single argument. As with LIVE3 and SIT, MEET1/2 may also occur with a locative constituent (16d).[14]

(16) a. $\overline{\text{INDEX}_1 \text{ TEACHER } \textbf{MEET1}}^{\text{re}}$ \ INDEX$_1$ $\overline{_1\text{LET-KNOW}_a}^{\text{rs}}$ # 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]

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 intransitively as well as transitively. An intransitive sentence with PLAY1 is displayed in (17a); a transitive use of PLAY2, with a null subject, is shown in (17b). 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 show. PLAY2, on the other hand, is typically used with the meaning of playing a (sports or card) game.

(17) 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), the signer's intuition was that older signers would use such constructions, but younger

14 Note that in the articulation of the verb MEET2 in (16d), 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.

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 (18a) and (18b).[15]

(18) a. rs over "WASH CAREFREE":
INDEX$_a$ CAREFREE **WASH** CAREFREE — 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 being stolen from the indirect object and the entity being stolen the direct object. (19a) includes both an indirect and a direct object.[16] (19b) 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.

(19) a. TOURIST++ ALL DEAF MONEY **STEAL1** — O2 O V
'Money gets stolen now and then from us, deaf tourists.' [stu17-A-03:24.85]

b. rs over the whole line:
WHO HAVE CL():FUSE **STEAL1** CL():FUSE — [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 can 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.

15 The classifier in (18b) could also be analyzed as a predicate rather than an object.

16 (19a) is actually an impersonal construction (otherwise not discussed), but there were no regular examples in the data that include both types of object.

7.4 Localization properties

In this section, I scrutinize the localization properties of neutral verbs. As discussed in Section 7.1.2, Meir (1998) has claimed for ISL that neutral verbs have the capacity to agree with their internal argument, and this claim has been 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 (see Chapter 2.3.4). On the former tier, I indicated for each token whether there was alignment between the place of articulation of the verb and the more agent-like referent, if present. On the latter tier, I signalled whether there was locus alignment between the verb and the more 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. The label 'localized' was used for verb tokens that were clearly 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 was localized at a distinct locus which had not previously been associated with a referent (i.e. localization 'on the fly'). The label 'congruent-a' was assigned when a verb appeared to be localized, but its place of articulation might have been influenced by an immediately preceding sign articulated at the same location. In another type of congruence, annotated as 'congruent-b', both the referent and the verb were articulated at the center of the signing space. In such cases, it could not be determined whether locus alignment was intended or merely coincidental.

The label 'incongruent' indicates that a verb was articulated at a location that was clearly different from a previously established referent locus. 'Default' signals that there was no locus for the verb to align with, either because it was a weather verb or because it took a null impersonal, generic or non-specific argument.

These argument types associate with the center of the signing space by default (see Chapter 11.4.5 for discussion). The label 'unclear' indicates that the referent the verb was expected to agree with had not been localized while the verb itself was articulated at the center of the signing space. Finally, the label 'default1st' was used when subject of the verb was first person, in which case the verb was expected to be phonologically blocked from localizing (e.g. Keller 1998). Interestingly, there seemed to be a couple of counterexamples in the data set (discussed below); these were annotated as 'localized1st'.

All the localization patterns introduced above are discussed and illustrated with pictures and examples in the subsections below.

7.4.1 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.[17] Table 7.2 tabulates the frequencies of the different localization patterns in this set of 135 tokens.

Tab. 7.2: 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

17 Of the 195 neutral-verb constructions, 29 examples include the verbs MEET1 and MEET2, which I treat as hybrids between neutral and agreement verbs. In terms of agreement marking, however, these forms are more like agreement 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 7.4.2.

As the table shows, fairly few verbs in the data set were 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), which happens to be one of the few forms in the data set that usually take an animate internal argument. Before turning to the general discussion of the localizing behavior of neutral verb forms, I first discuss the examples with DIE1, wich simultaneously serves to illustrate the different localization patterns that may occur with neutral verbs.

(20) displays an example of a construction with a localized instance of DIE1. Figure 7.1 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.

(20) INDEX$_a$ BIT PU LATER **DIE1**$_a$ S V
'She died later.' [fra05-B-09:55.15]

Fig. 7.1: The signs INDEX$_a$ (left panel) and DIE1 (right panel) from (20), which are articulated at the same locus on the vertical plane.

Another interesting example of localization is presented in (21); Figure 7.2 illustrates the final stretch of signs in the example with video stills. As can be observed in the first two panels of Figure 7.2, 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 & Onea (2016), localizes the referent in this example.[18] (21) 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.

(21) THROUGH INDEX$_1$ TV BEGINNING 8-O'CLOCK SWITCH-ON \
IMMEDIATELY PICTURE $\overline{\text{'diana'}}$ **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]

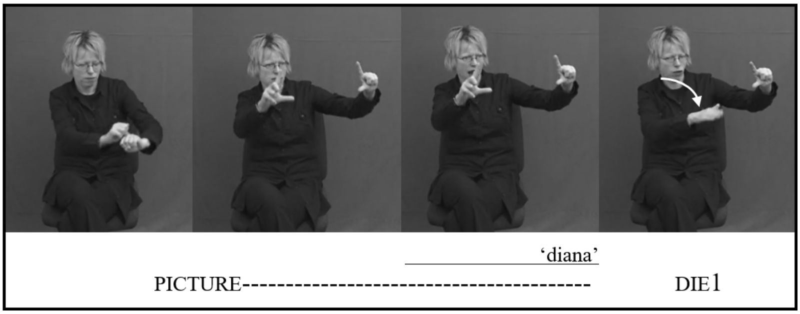


Fig. 7.2: Video stills representing the final signs in the second clause in (21). The signer mouths 'Diana' while manually holding the previous sign PICTURE, before localizing the verb DIE1 in the middle of the held sign.

In three examples with DIE1, there were no signs at all of overt localization of a referent, yet the verb was clearly articulated at a non-neutral location in the signing space; these constructions were annotated as 'localized-new'. One example is presented in (22); the articulation of the verb toward the left of the signing space is illustrated in Figure 7.3.[19] The subject of the verb had not been localized at all: the

18 Other strategies cited by Steinbach & Onea (2016), in addition to pointing, include 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.

19 Technically, the signer's hand is rather close to the center of the signing space in the articulation of DIE1 in Figure 7.3. 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 three signs which make up the subject (POSS$_1$ MAIN MOTHER) are all body-anchored. In the discourse preceding the example in (22), another referent ('grandmother') had been introduced at a contrastive location on the signer's right. Localization of the subject in (22) may thus have occurred implicitly, with the verb DIE1 utilizing this locus despite it not having been explicitly introduced.

(22) ALSO INDEX$_1$ SEVENTEEN \ POSS$_1$ MAIN MOTHER **DIE1**$_a$ S V
'When I was seventeen, my mother died.' [fra05-B-09:59.45]

Fig. 7.3: Video still illustrating the localized instance of the verb DIE1 in (22).

In 17 examples, DIE1 was congruent. In 14 of those cases, annotated as 'congruent-a', the verb was articulated at the same locus as the immediately preceding sign. In (23), for instance, a pronominal pointing sign is immediately followed by the neutral verb at the same locus, as illustrated in Figure 7.4. It was therefore not possible to establish whether DIE1 genuinely has been localized, or whether it was simply articulated at the same locus because of phonological assimilation processes. In the three other congruent cases, the verb was articulated at the center of the signing space, and the referent it was supposed to align with was signed at this same location. Such instances were labeled 'congruent-b'.

(23) INDEX$_a$ **DIE1**$_a$ S V
'They died.' [lei02-B-02:27.10]

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.

Fig. 7.4: 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.

Although the majority of instances of DIE1 were either localized or congruent with a referent locus (N=32), there were also a number of instances of incongruence between the verb and its subject with respect to the place of articulation (N=6).[20] An example is shown in (24); video stills displaying the articulation of the subject and the verb, respectively, are presented in Figure 7.5. 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').

(24) THEATER FACIAL-EXPRESSIONS GREAT \ UNTIL DATE INDEX$_a$ **DIE1**$_c$ PU
S V \ # S V
'His facial expressions were always spectacular in the theater, up until the day he died.' [koe18-A-00:25.45]

To summarize, DIE1 can be, and often is, localized to align with the R-locus of the subject, although I also observed some examples of clear incongruence. DIE1 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, and 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

20 There were a couple of 'unclear' cases as well, 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.

Fig. 7.5: Video stills illustrating the articulation of the pronominal subject and the verb DIE1 in (24), each localized at a different location.

preserve the iconic mapping between the position of the hands and the position of the knees – iconically represented by the signer's hands (see Chapter 4.4.3) – 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 associated with 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 may 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%) were annotated as 'congruent-b'. An additional 21 (15.5%) examples are analyzed as 'congruent-a', i.e. the verb and the directly preceding sign had the same place of articulation. In several of those cases, the preceding sign was itself the internal argument, such that these concurrently count as 'congruent-b' examples.

Take (25), for instance. As shown in the right panel of Figure 7.6, 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 7.6, BOAT, too, is articulated at the center of the signing space. Thus, the two signs are congruent in their their place of articulation, but it cannot be established whether this congruence was deliberate.

(25) CAN **BURN** PU — Mod V
'[The boat] could catch fire.' — [hh01-A-04:18.80]

Fig. 7.6: Video stills illustrating the articulation of the verb BURN in (25) (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.

Just three verb tokens which take an inanimate object were clearly localized; all examples involved the verb BOIL. One of the constructions is shown in (26a) (reproduced from (14c)). As can be observed, BOIL is articulated at the locus associated with the direct object POTATO. At the same time, there were hardly any neutral verbs that are clearly *not* localized: just two incongruent examples were attested in the data set. One incongruent verb is displayed in (26b); the argument the verb was 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.

(26) a. INDEX$_1$ **BOIL**$_a$ POTATO$_a$ \ INDEX$_1$ HATE$_a$ # S V O \ S V
'I hate cooking potatoes.' [hh01-A-03:13.95]
b. $\overline{\text{NOT}}^{\text{hs}}$ BORING **BE-DRY2**$_c$ $\overline{\text{NOT}}^{\text{hs}}$ V V'
'[The film] wasn't boring or dry.' [hb04-B-05:35.90]

Although only few neutral verb tokens were clearly localized at the locus associated with their internal argument, the proportion of verbs that were at least congruent (59%) is quite high. In contrast, de Beuzeville, Johnston & Schembri (2009), who carried out a corpus study on the modification properties of agreement and neutral ('locatable') verbs in Australian Sign Language (Auslan), report that a mere 28% of the neutral ('locatable') verb tokens in their data set were congruent or localized; the remaining 72% of examples were analyzed as unmodified.[21] In contrast, just

21 De Beuzeville, Johnston & Schembri (2009: p. 64) define congruent forms as being identical to their citation form while also "congruent with a spatial arrangement of locations associated with

9% of all DGS examples are analyzed as being incongruent with their internal argument.

Note that the annotation system I used is more fine-grained than the one adopted by de Beuzeville, Johnston & Schembri (2009). That is, I used additional annotation labels for verb tokens that (i) involved a first-person internal argument such that localization of the verb is phonologically blocked (‘default1st’; 14%), (ii) involved 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) were 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. 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, Johnston & Schembri (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 that are in congruence with the place of articulation of a nominal internal argument appear to be treated as unmodified instances in de Beuzeville, Johnston & Schembri (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

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 were probably annotated as modified forms.

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 both inanimate object and neutral verb were articulated at the center of the signing space.[22] Secondly, for animate arguments, localization on the signer's left or right is generally considered more natural – although the informants said it is not obligatory – and localization of neutral verbs to align with a previously localized animate argument was 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 (27). Meir (1998) refers to this kind of mechanism as pragmatic agreement.

(27) 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.[23] A related question which has so far remained unanswered is whether alignment of a neutral verb with a 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 are generally assumed to resist agreement with a first-person argument. Interestingly, however, I found four examples in the DGS corpus data of verb tokensm usually articulated in the signing space, that seemed to have undergone exactly such a transformation. Two of those examples are illustrated with video stills in Figure 7.7a and 7.7b; the constructions in which they appear are represented in (28a) and (28b), respectively.[24]

22 The potential for neutral verbs to localize at loci associated with external arguments was also discussed with the informants; the results are addressed in Section 7.4.2.

23 In 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.

24 For citation forms of SIT and BREAK, see Figure 2.4 and Figure 4.9b, respectively.

(28) a. INDEX$_1$ $\overline{\text{BE-BORED}}^{\text{rs}}$ \ INDEX$_1$ $\overline{\textbf{SIT}_1}^{\text{rs}}$ S [V] \ S [V]
‘I was bored. I was just sitting around.’ [fra05-10:54.35]

b. INDEX$_1$ BREATHLESS \ VERY INDEX$_1$ $\overline{\textbf{BREAK}_1}^{\text{rs}}$ S V \ S [V]
‘I was breathless and felt broken.’ [koe13-A-02:08.15]

(a) SIT **(b)** BREAK

Fig. 7.7: Two neutral verbs in first-person form.

The instance of SIT in Figure 7.7a 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. 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 could be given such an interpretation.

BREAK in (28b) 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 this mechanism is.

Finally, I have not yet addressed the behavior of MEET1 and MEET2 in this section. As mentioned previously, both these forms have a hybrid status, displaying properties of both neutral verbs and agreement verbs. The 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 Chapter 4.4; also see Börstell, Hörberg & Östling 2016). Indeed, the verbs – both two-handed signs – may simultanously reference two event participants by having each hand start out at a different locus, as in (29), illustrated in Figure 7.8. In their capacity to spatially align with two arguments, MEET1 and MEET2 are more like agreement 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 at the center of the signing space.

(29) INDEX$_1$ ONLY INDEX$_1$ $_{1,a}$**MEET1**+++ S V
'I would often meet up [with the hearing kids].' [fra05-B-02:26.10]

Fig. 7.8: 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 (30), repeated from (7a), the referents involved in the event are first and second person (under role shift). However, as can be observed from Figure 7.9, the hands begin their trajectory at the signer's left and right.

(30) $\overline{\text{INDEX}_2 \text{ INDEX}_1 \textbf{ MEET1} \text{ INDEX}}^{\text{re, rs}}$ [S/O O/S V O/Loc]
"'Shall you and I meet there?'" [lei08-A-12:31.95]

In conclusion, then, MEET1 and MEET2 can be argued to behave more like agreement verbs than like neutral verbs, since they regularly align with two arguments.

Fig. 7.9: An incongruent instance of MEET1.

7.4.2 External arguments and localization

This section investigates if neutral verbs can be localized at a locus associated with an external argument, and if so, under which conditions. I hypothesize the 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 R-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 7.3 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 localized at the location associated with the external argument, although there were a few tokens (N=3) which were congruent with the locus of the external argument. The majority of transitive constructions (N=18) involved 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 were 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

Tab. 7.3: Patterns of alignment of neutral verb tokens in relation to their external argument (N=63).

	Transitive		Intransitive	
Localization pattern	**#**	**%**	**#**	**%**
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

were annotated as incongruent. In addition, congruence (N=15) and localization (N=6) of neutral verb tokens in intransitive constructions was clearly more common than in transitive constructions.[25] These results fit with the predictions stated at the beginning of this section.

I should note that of the six localized instances, four cases appeared to mark a direct contrast. Two of these constructions are represented in (31a) and (31b). In (31a), 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 (31b).

(31) a. INDEX$_1$ 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 (32a), PLAY1 is localized at the locus associated with CHILD++, which had been assigned an R-locus two clauses earlier (32a). In (32b), COOK1 is localized at the locus of a previously introduced referent.

(32) 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]

25 I should remark, however, that there are also fewer first-person external subjects among the intransitive constructions.

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 were no neutral verb tokens that localized at the external argument's locus when there was an internal argument, while such localization did (sometimes) occur in unergative constructions. Admittedly, the number of tokens that these conclusions are based on was rather small, and the corpus data also cannot provide negative evidence. I therefore discussed the localizing behavior of neutral verbs with the two DGS informants based on paradigms such as in (33). 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.

(33) 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 sentence (33a), 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 (33b), 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 (33a). In other words, the informants clearly indicated localization is possible not but obligatory.

With regard to transitive constructions, such as the ones in (33c) and (33d), the informants were in agreement that the neutral verb cannot be articulated at the locus of the external argument, i.e. (33d) is considered ungrammatical. The construction in (33c) 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 capacity 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 being preferably associated with the center of the signing space. I 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 11.3, 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.

7.5 Subject-drop patterns

In Chapter 6.4, 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 (∅/pl), overtness (O/N), and presence of role shift in the clause (∅/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 could be first, second or third. 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 6.4 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 below, I collapse 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.

As Table 7.4 shows, there were hardly any examples with second-person subjects, although it is clear that both overt (N=6) and non-overt (N=4) subjects are

Tab. 7.4: (a) Overt and (b) null subjects in clauses with neutral verbs (N=181) in DGS; rs = role shift.

(a) *Overt subjects*

Person	No rs	Rs
First	40	7
Second	6	0
Third	61	4

(b) *Null subjects*

Person	No rs	Rs
First	33	3
Second	4	0
Third	20	3

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, were overt in 47 cases and null in 36 cases. Of the examples with third-person subject referents, 65 included an overt subject, while 23 examples involved a null subject. Notably, 20 of the examples with a null third-person subject did 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 without role shift, where just 2% of all third-person subjects were null. Of the neutral-verb constructions without role shift, almost 25% included a null third-person subject.

Of the intransitive clauses with a null third-person subject, three involved 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 are frequent.

For the sake of illustration, three examples with null subjects are presented in (34). Example (34a) includes a non-overt first-person subject; examples (34b) and (34c) both include a null third-person subject. Note that in (34c), 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.

(34) 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]

7.6 Summary

This chapter presented a detailed description of the 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.

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 postverbal.

Neutral verbs form a mixed group in terms of their 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 in 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) describes 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.[26]

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 11, 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 agreement verbs.

26 I 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.

8 Agreement verbs and spatial verbs

This chapter is the last of three to detail the properties of a specific verb type in German Sign Language (DGS); it is faithful to the same structure as Chapters 6 and 7 to optimize the conditions for comparison in Chapter 9.

Agreement 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. Padden 1988; Rathmann & Mathur 2008; Lillo-Martin & Meier 2011; Pfau, Salzmann & Steinbach 2018). Depending on the 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 agreement verbs in the DGS corpus data, as discussed in this chapter.

A concise overview of previous studies on agreement verbs in sign languages is presented in Section 8.1. In Sections 8.2 to 8.5, the morphosyntactic properties of agreement verbs are examined, with constituent order preferences, valency patterns, agreement properties and subject-drop patterns all addressed in turn. Section 8.6 presents a summary of the main findings.

8.1 Background

Out of the three main verb types examined in this book, agreement 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 appeared; see e.g. Quer (2021) on theoretical perspectives and Hosemann (2021) on experimental perspectives, but also Mathur & Rathmann (2012), Costello (2015), and Lillo-Martin & 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 research. I refer the interested reader to the works cited above for more extensive overviews.

1 One of the aims of this chapter is to determine whether the grouping together of verbs that agree with person, i.e. regular agreement verbs, and verbs that agree with location, i.e. spatial verbs (Janis 1992, 1995; Quadros & Quer 2008), is justified on the basis of their formational and morphosyntactic properties.

https://doi.org/10.1515/9783110742787-008

Section 8.1.1 discusses the different subtypes of agreement verbs which have been described in the literature and categorizes the verbs in the DGS corpus data accordingly. This descriptive part offers a glance at the complexity of the phenomenon under discussion and introduces the biggest theoretical challenges. Section 8.1.2 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 agreement verbs (and spatial verbs) in terms of agreement.

8.1.1 Different kinds of agreement verbs

A prototypical agreement 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 treated as an indirect object in this book (see Chapter 2.3.2.2). As such, the mechanism exploited to express agreement is spatial in nature.[2] An example of a prototypical agreement verb in DGS is TEACH (Figure 8.1). In Figure 8.1a, the path movement of TEACH starts from one third-person locus and ends at another.[3] In Figure 8.1b, 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 the hands face away from the subject locus and face toward the object locus. Indeed, in various sign languages, some verbs do not have a path movement but exclusively use orientation change to mark agreement (e.g. Friedman 1975; Valli & Lucas 1992; Meir 1998). None of the agreement verb forms in the data extracted from the DGS Corpus are of this kind.

There are several other types of agreement verbs that deviate from the prototypical pattern. Firstly, some verbs – which have been dubbed 'backward verbs' in the literature (see e.g. Friedman 1975; Padden 1988; Shepard-Kegl 1985; Meir 1998; Quadros & Quer 2008) – show reverse directionality: their path movement goes from object to subject rather than the other way around. An example from the DGS data is the verb TAKE1 (Figure 8.2). Backward verbs pose a significant challenge in the attempt to characterize directionality in terms of (syntactic) agreement, as they

2 See Section 8.1.2 for alternative views on the grammatical status of this mechanism. For convenience, I continue to use the term 'agreement'.

3 Loci 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 the full list of conventions.

(a) $_{a}$TEACH$_{b}$

(b) $_{a}$TEACH$_{1}$

Fig. 8.1: Two instances of the agreement verb TEACH with path modification.

can be taken as counterevidence against the perspective that agreement verbs in sign languages mark syntactic relations. Theoretical proposals that have been put forward to resolve the issue are discussed in Section 8.1.2.

Fig. 8.2: An instance of the backward agreement verb TAKE1 with path modification.

Secondly, some verbs can 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 8.3), for instance, starts at the locus associated with the object and ends its trajectory on 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 agreement verbs.

Thirdly, some linguists have analyzed the localization of what I call neutral verbs as single-argument agreement (e.g. Costello 2015; Lourenço 2018; Lourenço & Wilbur 2018). Since I already discussed this verb type extensively in Chapter 7, let me simply reiterate that analyses which view localization as agreement may

Fig. 8.3: An instance of the hybrid and backward verb HUG1, which has a fixed final place of articulation on the body.

move into one of two possible directions: the agreement mechanism employed by agreement verbs and neutral verbs is either considered to be distinct, or regarded as the same.

Finally, Padden (1988, 1990), and many others in her wake, have traditionally made a distinction between spatial verbs and agreement 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 essentially the same for the two types of verbs (e.g. Janis 1992; Quadros & Quer 2008); see Section 8.1.2.2 for more discussion.

While the different types of agreement 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. Meier 1982; Padden 1988; Bahan 1996; Liddell 2003 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, Johnston & Schembri 2009 for Australian Sign Language (Auslan); Schuit 2013 for Inuit Sign Language; Fenlon, Schembri & Cormier 2018 for British Sign Language (BSL); Legeland 2016 for Sign Language of the Netherlands (NGT)). This is another matter I return to in the next section.

Table 8.1 lists all the agreement 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, e.g. a city. In Sections 8.2 to 8.5, the similarities and differences between constructions with regular agreement verbs and spatial verbs are routinely addressed.

Tab. 8.1: Agreement verb forms (N=24) in the DGS corpus data with specification of their subtype; no specification means prototypical agreement 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	

8.1.2 Theoretical approaches toward agreement verbs

In the previous section, I 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 8.1.2.1 before moving on to the accounts that do consider the modification of the path movement of agreement verbs to be an expression of agreement in Section 8.1.2.2. Each of these analyses can solve some of the puzzles introduced in the previous section, although none can account for every problem equally successfully.

8.1.2.1 Agreement or not?

Although, since Padden's (1988) seminal work on ASL, many sign linguists have supported an agreement analysis of directional verbs, agreement scepticists have been on the rise 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 & Schembri (2007) and Schembri, Cormier & 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 agreement 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 8.1.2.2) no longer requires a complicated answer: the controller simply is "the mental representation of the spatial location of the referent" (Schembri, Cormier & Fenlon 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. Padden 1988; Meir et al. 2007; Engberg-Pedersen 1993); in some cases, it has even been argued that both the subject and object are optionally marked (e.g. de Beuzeville, Johnston & Schembri 2009; Schuit 2013; Fenlon, Schembri & Cormier 2018; Legeland 2016).

In two extensive corpus-based studies, de Beuzeville, Johnston & Schembri (2009) and Fenlon, Schembri & Cormier (2018) investigate the degree of optionality of agreement marking in Auslan and BSL, respectively. The results in these two studies are comparable, with agreement verbs occurring in unmodified form in approximately 30% of the examples in their data. Fenlon, Schembri & Cormier (2018) additionally calculate the rate of modification to align with the agent vs. patient arguments for each verb token, and 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. constructions with a first-person agent and a prototypical agreement 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, Schembri & Cormier (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 agreement verbs represent a "fusion of morphemic and deictic gestural elements" (Fenlon, Schembri & Cormier 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, Lamberton & Santoro 2013, Schlenker 2014, and Oomen 2017, for demonstration of the contrary). The studies discussed in the next section all take the idea that agreement verbs express grammatical agreement seriously, and have presented a variety of arguments in support of that view.

8.1.2.2 Agreement accounts

Proponents of an agreement analysis (e.g. Fischer & Gough 1978; Padden 1988; Janis 1995; Cormier, Wechsler & Meier 1998; Aronoff, Meir & Sandler 2005; Lillo-Martin & Meier 2011) 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

4 The 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.

5 As Lillo-Martin & 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 agreement verbs also displays idiosyncrasies.

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 & Klima (1990) propose that noun phrases in sign languages, like in spoken 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, Cormier & Fenlon 2018).

Advocates of an agreement account have offered various solutions to the listability problem; here, I briefly mention two. Firstly, Lillo-Martin & 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 agreement verbs build upon the R-locus analysis by Lillo-Martin & 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. Cormier, Wechsler & Meier 1998; Aronoff, Meir & Sandler 2005; Lillo-Martin & Meier 2011).

Secondly, Steinbach & 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

6 This observation is one of the reasons some researchers, such as Costello (2015), Keller (1998), and Steinbach & Onea (2016), have proposed features other than person. Steinbach & Onea's (2016) account plays an important role in the formal analysis in Chapter 11.

7 In fact, loci assigned to referents may even change within a discourse, e.g. under role shift.

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. Friedman 1975; Shepard-Kegl 1985; Bos 2017; Meir 1998, 2002) to propose thematic or hybrid analyses which integrate the idea that the movement trajectory of an agreement 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 Friedman 1975; Shepard-Kegl 1985; Bos 2017, a.o.). The fingertips or palm of the hand are faced toward the object, which is the thematic 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. Quadros & Quer (2008), for instance, note that there are many instances of agreement 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. Quadros & 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, Salzmann & Steinbach (2018), who additionally point out that Meir's account cannot deal with cross-linguistic variation or diachronic change in verb type. If thematic relations

8 Yet, 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 agreement verbs in ASL. As such, she concludes, the syntactic categories of subject and object must factor into the agreement process somehow.

9 As 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 11.

determine the direction of movement in agreement 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.

Pfau, Salzmann & Steinbach (2018) present a different solution to the problem of backward verbs, proposing that they display ergative agreement. As such, they consider agreement in sign languages to be a fully syntactic process. Pfau, Salzmann & Steinbach's (2018) formal analysis utilizes modality-independent mechanisms – indeed, ergative agreement is also attested in spoken languages – although they claim that the way in which they are combined is modality-specific. I will return to Pfau, Salzmann & Steinbach's (2018) account of backward verbs in Chapter 11.2.1.

Quadros & Quer (2008) also address another frequently raised question in connection to agreement verbs: should spatial verbs be treated as a subtype of agreement verbs or rather as a separate category? Quadros & Quer (2008) show that the boundary between agreement and spatial verbs is fuzzy, as some verbs agree both with person as well as with locations. The examples in (1) from Libras (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. Quadros & Quer (2008) argue that this ungrammaticality arises because null subjects in Libras, as in other sign languages, are licensed by agreement marking (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

10 In order to avoid confusion, the glosses have been slightly altered, as Quadros and Quer use single letter subscripts to refer to locations, while I (also) use those subscripts to indicate referent loci.

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 Quadros & Quer (2008) to conclude that agreement 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 between spatial and agreement verbs.[11]

More recently, Kwok, Berk & Lillo-Martin (2020) have argued that person agreement and locative agreement have different status after all, a view they support with evidence from late learners and the emergence of new sign languages. The difference, they claim, is that locative and person agreement involve concrete vs. abstract use of space, respectively. They additionally show that, diachronically, abstract use of space is always preceded by concrete use of space. Importantly, the account allows for the possibility that verbs may sometimes display person-, and sometimes locative agreement (i.e. they are 'fuzzy', in Quadros & Quer's terms).

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. Meier 1982; Padden 1988; Bahan 1996; Liddell 2003 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, Johnston & Schembri 2009 for Auslan; Fenlon, Schembri & Cormier 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, Salzmann & Steinbach (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.

11 According to Janis (1992, 1995), agreement in sign languages is controlled by the case of a verb's arguments rather than their thematic role.

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 6.1.1). Body-anchored verbs mark subjects in this way by default, while this standard pattern becomes obscured through person marking in the case of agreement 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 11 is quite close in spirit to Meir et al.'s; I thus return to their account there.

8.2 Constituent order patterns

In this section, the constituent order of constructions with regular agreement verbs and spatial verbs are separately analyzed and discussed. As in the two preceding chapters, the description is necessarily based on surface constituent order, since the underlying order of constructions cannot be established based on corpus data. In Chapter 9.1, constituent order patterns of the different verb types are systematically compared; this may yield new insights into ordering preferences along verb type lines (cf. Napoli & Sutton-Spence 2014).

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. 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.

The analysis is based on a total of 285 main clauses with agreement verbs (50 dependent clauses with agreement/spatial verbs were excluded). 187 of these constructions include a regular agreement verb, while 98 examples include a spatial verb. As in previous chapters, impersonal constructions and nominal or adjectival uses of agreement verb forms are excluded from analysis.

8.2.1 Agreement verbs

The 187 main clauses with agreement verbs represent a total of 60 different constituent orders, of which 18 occurred with a frequency of two or more. Those orders are represented in Table 8.2.

Tab. 8.2: Constituent order in main clauses with regular agreement 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 commonly attested orders were S V (N=40; 21.4%) and V (N=22; 11.8%). In addition, 10 examples (5.3%) displayed [V] order (i.e. with role-shift markers), 9 examples (4.8%) involved S [V] order, and an additional 4 examples (2.1%) displayed [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 (2).[12] Since agreement verbs are necessarily (di)transitive, object drop must be involved in each of the clauses in (2); (2b) and (2c) additionally involve subject drop. In all three cases, there is locus alignment between the verb and its arguments.

(2) a. INDEX$_a$ ONCE-AGAIN $_a$**SEND2**$_1$ — 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]

c. $\overline{_a\textbf{TAKE1}_{(1)}}^{rs}$ — [V]
‘[I] would take [the book].’ — [mst10-B-06:10.70]

Clauses with agreement verbs fairly often included a direct object: there were 59 (31.6%) such examples in the data set. 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

12 A letter subscript between round brackets, as in (2b) and (2c), 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 8.4 discusses further details; for a full list of conventions, see Notation conventions.

order and 20 (33.9%) showing VO order.[13] 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 (3a) and (3b), respectively. S [V O] order is displayed in (3c), 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 coincidental correspondence.

(3) 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. INDEX$_1$ $\overline{_{(1)}\textbf{SEE}_a \text{ INDEX}_a}^{rs}$ S [V O]
'I saw it.' [lei13-A-05:51.80]

The agreement 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 (4).[14]

(4) a. DEVELOP \ SCHOOL INDEX$_1$ $_1$**SEE**$_a$++ \ INDEX$_a$ SEVERAL ABROAD COME+++ OUTSIDE CL():RUN-AROUND S V CO
'At some point, I saw immigrant children playing outside at school.' [mst10-A-02:01.80]

b. DEAF $_{a*}$**TELL2**$_1$ \ GENUINE ALL INTEREST S V CO
'A couple of deaf people told [me] they were really interested.' [fra07-A-03:17.60]

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 included 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 (5). The sentence includes a classifier predicate referencing the tool used in the beating denoted by the lex-

13 In 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.

14 An asterisk following a subscript, as in example (4b), indicates that the verb appears to mark a locus but this locus has not previously been introduced. See the Notation conventions or Section 8.4 for further details.

ical 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.[15]

(5) TEACHER $\overline{{}_1\text{CL}():\text{BEAT-WITH-STICK}_a\ {}_1\textbf{BEAT}_a}^{\text{rs}}$ 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 agreement verbs are S V and V; the canonical position of the direct object is preverbal but there were 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.

8.2.2 Spatial verbs

In the 98 main clauses in the data that contained a spatial verb, a total of 33 different constituent orders were attested; of those, 23 orders occurred just once. Table 8.3 tabulates the frequencies of constituent orders occurring at least twice in the data.

Tab. 8.3: 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 were S V (N=22; 22.4%) 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 (6). Of the 17 spatial verb constructions that contained a direct object, 16 involved a preverbal object, while just one example displayed a postverbal object.

15 Overall, 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.

(6) a. INDEX$_a$ **LEAVE**$_{b*}$ — S V
‘They left.’ [hb06a-B-02:08.95]
b. LATER $_{(1)}$**GO1**$_{a*}$ — 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 spatial-verb constructions, 30 (30.6%) included such a constituent. In 13 of these 30 cases (43.3%), the locative constituent occurred in preverbal position; an example is shown in (7a). 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.[16] 12 examples (40.0%) display V O/Loc order (7b). In (7b), 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 involved clear topicalization of that constituent, while the remaining five examples involved either a locative constituent sandwiched in between two verb copies (7c) or two locative constituents sandwiching a verb.

(7) a. $\overline{\text{INDEX}_a\ \text{WORLD}}^{\text{re}}$ CONGRESS **GO1**$_a$ — 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]
c. THEN 4-WEEK 5-WEEK LATER $\overline{\backslash}^{\text{bl}}$ INDEX$_1$ $_{(1)}$**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, analysis of the constructions with spatial verbs reveals 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).[17]

16 Note that INDEX$_a$ and the following sign are marked by raised eyebrows. Thus, the part preceding the verb meday be topicalized, such that there could have been movement from postverbal position for this purpose.

17 Also see Chapter 7.3.

8.3 Valency patterns

This section discusses valency patterns in constructions with regular agreement verbs (Section 8.3.1) and spatial verbs (Section 8.3.2). In anticipation of the discussion on agreement marking in Section 8.4, I also habitually comment on the localization properties of the verb tokens in the examples presented in this section.

8.3.1 Agreement verbs

Trivially, all regular agreement 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 were attested in the corpus data. (8) presents three transitive constructions. In (8a), 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 (8b), 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 were also attested, such as (8c) 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.[18]

(8) a. $\overline{\text{INDEX}_1 \text{ ALL INDEX}_1 \text{ STICK}_1 \textbf{ BEAT}_{(a)}}^{\text{rs}}$ [S O S O/Instr V]
'"I'm going to hit you all with a stick."' [koe17a-B-06:00.10]

b. $\overline{\text{INDEX}_1 \text{ RIGHT FEEL-GOOD}}^{\text{re}}$ \ $\text{INDEX}_a\ {}_1\textbf{FOLLOW}_a$ O V
'When I feel comfortable, [I] would follow him.' [mst10-B-10:57.65]

c. MOTHER $\overline{{}_a\textbf{TAKE1}_b}^{\text{hs}}$ 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 (9), 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.

18 Note that TAKE1 is a backward verb, such that the subscript *a* corresponds to the locus of the object and the subscript *b* to the locus of the subject.

(9) NOW $POSS_1$ 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). (10) presents several examples. In (10a), all three arguments are overt, and the verb TEACH agrees with both the subject and the indirect object. Example (10b) with the verb GIVE has two null objects and an overt subject. The verb moves from a locus that could 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, which is indicated by the asterisk following the subscript *a*. (10c) displays an example with the verb SHOW and a clausal complement under the scope of role shift. Finally, HELP1 in example (10d) 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.

(10) a. LIFE-PARTNER $INDEX_1$ $INDEX_a$ $_a$**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: $INDEX_a$ $_a$**SHOW**$_b$ \ $\overline{\text{RUSSIA GOT-YOU}}^{\text{rs}}$
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. $INDEX_1$ $_a$**HELP1**$_1$ 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 (11). Neither example includes an indirect object (i.e. a recipient); in fact, it does not appear to be part of the verbs’ argument structure.[19] Now, agreement verbs would generally be expected to align with the locus of the recipient argument at the end of their trajectory. However, this is not possible for the examples in (11), since there is no argument to agree with. It is worth noting that

19 Note that in (11a), the direct object (‘hearing aids’) is non-overt.

such examples consistently show the final place of articulation of the agreement verb to be the center of the signing space (also see Section 8.4).

(11) a. INDEX$_a$ $\overline{{}_1\textbf{TELL3}}^{\text{rs}}$ S [V]
'He talked [about hearing aids].' [stu13-B-11:34.40]
b. INDEX$_1$ $_{(a)}$**SHOW** \ UNTIL GET-OUT S V CO
'They would show the exit [from the lunar module].'
[mst13-A-01:36.30]

8.3.2 Spatial verbs

The spatial verbs GO1, GO2, and LEAVE may occur with a subject and an optional locative constituent; three examples are presented in (12). In (12a), GO1 has a path movement which goes from the signer to a locus that was not previously introduced, but which could potentially refer to the geographical location of AUSTRIA. BACK-AND-FORTH references the same locus. In (12b), 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, in (12c), LEAVE has a path movement from the signer (the subject) to some locus in the signing space which is not associated with any particular location.

(12) a. INDEX$_1$ REGULAR $_{(1)}$**GO1**$_{a*}$ AUSTRIA $_1$BACK-AND-FORTH$_a$++ S V O/Loc
'We went to Austria over and over again.' [hb06a-B-00:08.95]
b. RATHER INVOLVED $_{(1)}$**GO2**$_a$ V
'I wish I had been there.' [koe19b-A-08:15.45]
c. INDEX$_1$ $_{(1)}$**LEAVE**$_{a*}$ S V
'I left.' [lei13-A-04:38.30]

The spatial verbs BRING, SEND1, and THROW occur in transitive constructions with a subject and an object and may additionally allow a locative constituent. (13) presents two examples. In (13a), 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.[20] However, in other examples, such as (13b), the verb appears to show object agreement at the start of its trajectory (see Section

20 The object NONE MEDAL is not localized as NONE is articulated directly in front of the signer and MEDAL is body-anchored.

8.4.2 for discussion). The final location is congruent with the place of articulation of the signs HIGH SCHOOL, which are signed immediately following the verb.

(13) a. NONE MEDAL $_{a}$**BRING**$_{b*}$ O V
'[We] didn't bring any medals home.' [ber04-B-02:39.55]

b. POSS$_{1}$ FATHER WANT \ INDEX$_{1}$ $_{(1)}$**SEND1**$_{(a)}$ HIGH$_{a}$ SCHOOL$_{a}$ # O V O/Loc
'My father wanted to send me to college.' [mst16-B-01:41.85]

8.4 Agreement properties

The agreement properties of regular agreement verbs (including backward verbs) and spatial verbs are discussed in Section 8.4.1 and 8.4.2, respectively. With regard to the former, special attention is paid 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. Recall, firstly, that agreement 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 agreement verb. A variety of annotation values were utilized.

Firstly, when a verb expressed 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 received the annotation value 'agreeing'. Example (14), for instance, displays double agreement marking and was thus annotated as 'agreeing' on both the AS-1-agreement and AS-2-agreement tiers.[21]

(14) $_{a}$**BEAT**$_{1}$ V
'[The Hungarians] beat [us].' [ber04-B-05:48.50]

Sometimes a verb aligned with a distinct locus that had not been associated with a referent in the discourse yet, such that the verb appeared to simultaneously

21 In (14), both arguments are null but the subject referent had been assigned a locus earlier in the discourse, and the signer represents the object.

localize a referent or location as well as mark agreement with it.[22] An example illustrating this pattern is shown in (15), with Figure 8.4 illustrating that the verb SHOW is clearly modified. Another example was displayed earlier in (10b). 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' was used to signal such cases.

(15) RIGHT $_1$**SHOW**$_{a*}$ V
'[I] always show [them] [the two deaf clubs].' [ber12b-B-05:43.45]

Fig. 8.4: 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 aligned with an argument, but this could 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 were labeled 'congruent-a'. An example is presented in (16); the screenshots in Figure 8.5 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*)').

(16) INDEX$_a$ $_{(a)}$**TELL3**$_1$ FROM CREATION PU S V O
'He also talked to me about the Creation.' [mst10-B-03:37.25]

22 Spatial verbs frequently mark loci that have not previously been introduced in the discourse. Section 8.4.2 addresses this observation in more detail.

Fig. 8.5: The signs INDEX$_a$ (left) and TELL3 (right) from example (16), where the initial place of articulation of the verb might have been phonologically influenced by that of the subject.

Other congruent but ambiguous cases occurred when arguments were localized at or close to the center of the signing space. When a verb began or ended its path movement at that same location, it was difficult to establish whether it expressed agreement or simply occurred in unmodified form. Such examples were labeled ‘congruent-b’. This category corresponds to the one Fenlon, Schembri & Cormier (2018) call ‘congruent’ in their study on agreement marking in BSL. (17) presents an example of a verb with a final location 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 8.6a). The verb FOLLOW, subsequently, has a path movement which also ends at this location in the signing space.

(17) INDEX$_1$ FAMILY PRESENT$_{(a)}$ [...] INDEX$_1$ $_1$**FOLLOW**$_{(a)}$ S V
‘I had some family members there. [...] I followed their lead.’
[goe03-A-03:54.20]

There were also several annotation options for verb tokens which did not appear to show agreement. The label ‘unclear’ was used when (i) the argument the verb was expected to agree with has not been localized, and (ii) the verb’s place of articulation was 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 was expected to agree with was annotated as ‘incongruent’. This also includes examples where the verb, but not the argument it could have agreed with, was articulated at the center of the signing space. Finally, several agreement verbs in the data set 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 could have

(a) FAMILY PRESENT$_{(a)}$ **(b)** $_{1}$FOLLOW$_{(a)}$

Fig. 8.6: (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.

been expected to occur. This was indicated with the label 'body' on the relevant tier.

The annotation 'default' signals that there was no (indirect) object for a verb to agree with. As I discussed in Section 8.3.1, 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 agreement verbs consistently end their trajectory at the center of the signing space by way of default.

The label 'default' was also used for some examples with SEE and LOOK-AT2 co-occurring with an object indicating a certain scenario witnessed by the subject rather than a concrete entity (9). 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 were followed by additional specifications in case a verb was not a prototypical agreement verb, that is, when it was characterized by something else than a path movement from subject to direct object. Firstly, ditransitive verbs (GIVE, SEND2, TEACH, SHOW, TELL2, TELL3) that aligned with their goal or recipient argument, analyzed in this study as indirect objects, receive the additional specification '-o2'. For backward verbs, '-o' and '-s' indicated that the verb agreed 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 seemed to align with was always explicitly specified. Alignment with a locus which could be associated with an argument was signaled with the suffix '-s', '-o', or '-o2', depending on the argument type. When the verb's initial or final place of articulation aligned with a location, the suffix '-loc' is used. Labels were combined (e.g. '-s/loc') in case of ambiguity. Finally, when plurality was marked in a verb form by means of iterations of the sign at incrementally shifting beginning or end points, the label '-pl' was added to the basic annotation.

8.4.1 Agreement verbs

Firstly, Table 8.4 tabulates the frequencies and proportions of the different agreement patterns with regular agreement verbs at the initial place of articulation.

Tab. 8.4: Agreement patterns with regular agreement 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 agreement verbs, 102 examples (47.4%; including two forms with plural marking) displayed unambiguous agreement with their subject. Twelve examples (5.6%) involved a backward verb and thus agreed with the object rather than the subject. In an additional eleven examples – eight (3.7%) with regular and three (1.4%) with backward verbs – the verb started at a locus which was clearly off-center but which did not appear to have been associated with a referent yet. These examples suggest that localization had occurred on the fly. Six examples (2.8%; including one plural) seemingly expressed 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) were articulated at or close to the center of the signing space, just like the referent they were expected to agree with.

In 38 cases (17.7%) – all constructions with instances of the verb form SEE – agreement marking could not occur because the verb has a fixed initial body-anchored place of articulation. Five examples (2.3%; including one backward verb) were labeled 'unclear': they had a central place of articulation, and the argument they were expected to agree with had not been localized earlier in the discourse. Finally, there were 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, Schembri & Cormier (2018) for BSL. 31% of the agreement verb tokens in their data set were articulated at a location which was incongruent with the agent locus. If the DGS verbs labeled 'unclear' and 'incongruent' – likely subsumed under the same category 'incongruent' in Fenlon, Schembri & Cormier (2018) – are added up, and the examples in Table 8.4 involving object agreement or a fixed body-anchored initial place of articulation are excluded, then only 7.3% of regular agreement verb tokens in the corpus DGS data are incongruent with their subject locus.[23] Conversely, 92.7% of tokens express what Fenlon, Schembri & Cormier (2018) would categorize as agreement.[24]

The results with respect to agreement marking at the final place of articulation of agreement verbs, which usually corresponds with object marking, are presented in Table 8.5.

A total of 119 (55.3%) examples unambiguously agreed with a singular or plural direct or indirect object, and an additional 13 (6.0%) examples appeared to localize an object on the spot ('agreeing-new'). 21 (9.8%) examples displayed congruence between the place of articulation of the verb and the object locus. Just two (0.9%) examples were annotated as 'unclear', while seven (3.3%) examples with regular agreement verbs were incongruent. Six examples involved backward verbs with a fixed final place of articulation, while 35 examples involved constructions either without an indirect object or with a complement clause as an indirect object, such that the verb had a default place of articulation at the center of the signing space.

23 This number changes slightly if backward verbs are also taken into account. Table 8.5 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 agreement verbs, then, 13 (7.6%) would be analyzed as being incongruent with the subject locus.

24 To be more exact, Fenlon, Schembri & Cormier (2018) present two analyses; one in which they group agreeing and congruent examples together, and one in which they treat them separately.

Tab. 8.5: Agreement patterns with regular agreement verbs (N=215) at the second agreement slot.

Agreement pattern	Spec.	#	%
agreeing		59	27.4
	-o2	58	27.0
	-s	7	3.3
	-pl	2	0.9
agreeing-new		6	2.8
	-o2	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

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 were 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 agreement verb tokens expressing object agreement, as opposed to just nine (5.6%) examples lacking agreement marking.[25] Again, these proportions differ from those reported for BSL in Fenlon, Schembri & Cormier (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, Schembri & Cormier (2018) for BSL. For further discussion on this point, see Chapter 9.3.

25 When the annotation values at the initial place of articulation of backward verbs (see Table 8.4) are included, the percentage of agreeing tokens becomes 93.9%, as opposed to 6.1% of incongruent examples.

8.4.2 Spatial verbs

In terms of agreement properties, spatial verbs were rather more challenging to analyze than regular agreement verbs. In part, this was 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 marked loci that were not (yet) associated with anything previously localized in the discourse – be that a location or referent. Indeed, I believe these observations are rather 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.[26] The division corresponds to the division that can be made based on the valency patterns of these verbs (Section 8.3.2).

Firstly, GO1, GO2, and LEAVE (N=87) – all verbs that do not take a regular direct 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 (18). Figure 8.7 illustrates the articulation of the subject and the verb in this clause.

(18) INDEX$_{a}$ $_{1}$**LEAVE**$_{b*}$ S V
‘He left.’ [hb06a-A-07:28.00]

In fact, there are no tokens of GO1, GO2, or LEAVE in the data that show unambiguous agreement with a non-first person subject referent. While there were some congruent examples, these all involved cases in which the subject referent was 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 I consulted on the matter both claim that this is possible – but it is evident that subject marking is certainly not the default.

26 Doing so makes presenting tables, as I have done in the previous section for regular agreement 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.

(a) INDEX$_a$ **(b)** $_1$LEAVE$_{b*}$

Fig. 8.7: 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.

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 were two clear examples in the corpus data including a spatial verb that did have a modified initial place of articulation aligning with a location; one of these examples is illustrated in (19). The second instance of GO1 in (19) 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.

(19) INDEX$_1$ AFRICA $_{(1)}$**GO1**$_{a*}$ \ TELL1 \ $_a$**GO1**$_{b*}$ \ INDEX$_1$ 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, more variation was attested, with signers using so many different locations that – when put together – they more or less form an arc in the signing space. Strikingly, in 66 out of 87 examples (75.9%), the signer referenced a location in space which had not previously been introduced in the discourse (annotated as 'agreeing-new-loc'). It is furthermore notable that the final place of articulation often occurred toward the far edge of the signing space, as with LEAVE in (18) (see Figure 8.7). In just 16 examples (18.4%), the signer clearly marked a location introduced earlier in the discourse. The remaining five examples were annotated as congruent or unclear.

From these numbers, we can conclude that spatial verbs generally end their trajectory at a non-neutral yet unintroduced location, even when it is unclear from the context what location the final place of articulation would semantically correspond to. (18) 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 agreement 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 (20), illustrated with video stills in Figure 8.8. These spatial verbs are thus unlike regular agreement 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).

(20) WITH POSS$_1$ CHILD++$_a$ CLEAR POSS$_1$ $_a$**BRING**$_{b*}$ O V
‘[I] would take my children with me.’ [koe20-A-04:35.60]

(a) CHILD+++ **(b)** $_a$BRING$_{b*}$

Fig. 8.8: (a) The localization of the object CHILD++ from example (20). (b) The articulation of the verb BRING, which starts at the object locus and ends at some previously unintroduced location.

Interestingly, there were several examples in which the spatial verb appeared to start out from the subject locus. One of these examples was previously displayed in (13a); it is repeated below as (21) and illustrated with the video stills in Figure

8.9. The subject pronoun INDEX$_{1pl}$ was signed a couple of clauses preceding (21). It is articulated with an arc movement resulting in contact with the signer's chest (see Figure 8.9a).

(21) NONE MEDAL $_{a}$**BRING**$_{b*}$ O V
'[We] didn't bring any medals home.' [ber04-B-02:39.55]

(a) INDEX$_{1pl}$

(b) $_{a}$BRING$_{b*}$

Fig. 8.9: A first-person plural pronoun, articulated in the clause preceding the construction in (21), and the articulation of the verb BRING in (21).

The final place of articulation of the verbs BRING, THROW, and SEND1 frequently marked out a previously unintroduced location in the signing space (19 out of 33 (57.6%) examples were labeled 'agreeing-new-loc'). Still, there were also examples that aligned with a previously established locus referring to either a location or a referent: a handful of instances of BRING appeared to end their trajectory at the subject locus, while the verbs THROW and SEND1 10.1 showed some potential for alignment with the indirect object locus at the end of their trajectory (22) (see Chapter for further discussion).[27]

(22) INDEX$_{a}$ WITH $_{a}$**SEND1**$_{b}$ 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 agreement verbs with regard to their alignment properties, suggesting that they should also be analyzed differently in formal

27 The remaining examples are congruent or unclear.

terms. In Chapter 10, I propose a theoretical analysis of spatial verbs to account for the patterns described above.

8.5 Subject-drop patterns

This section describes subject-drop patterns in constructions with agreement and spatial verbs, with particular attention paid to the interaction between agreement marking and subject drop: if agreement verbs license subject drop through agreement marking (as proposed for ASL by Lillo-Martin 1986, 1991), then we should find no examples with both null subjects and lack of agreement marking.[28] Subject-drop patterns with regular agreement verbs, including backward verbs, are discussed in Section 8.5.1, followed by a discussion of subject drop in constructions with spatial verbs in Section 8.5.2.

8.5.1 Agreement verbs

To start off, there are three verbs in the data set (SEE, HUG1, SMELL1) with a fixed body-anchored place of articulation where subject marking would otherwise be expected. Under the hypothesis, proposed in Chapter 6.4, that body-anchoring leads to a default first-person interpretation of the subject in the absence of an overt argument, the prediction for these verbs is that they do not occur with null non-first person subjects. And indeed, no such examples were attested. Of the 44 examples including either of these three verb forms, 14 included 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 involved a first-person subject, which was overt in 23 cases and null in seven cases. As such, these results neatly align with the pattern described in Chapter 6.4.

Once the examples with hybrid verbs are excluded, a total of 171 examples with agreement verbs remain. Table 8.6 tabulates the subject-drop patterns.[29] As can be observed, both first- and third-person subjects were overt approximately two

28 Object-drop patterns are not systematically analyzed in this study, and are left to future research. However, as illustrated by the constituent order patterns in Section 8.2, it is clear that it occurs – and with a higher rate than subject drop – both with agreement verbs as well as the three spatial verbs BRING, LEAVE, and SEND1.

29 See Chapter 2.3.5 for a description of the annotation procedure on which the analysis in this section is based.

times more often than they are not.[30] Still, null subjects occurred with regularity: leaving aside the examples with role shift, 18 clauses with first-person referents and 27 clauses with third-person referents included a null subject.

Tab. 8.6: (a) Overt and (b) null subjects in clauses with regular agreement verbs (N=171) in DGS; rs = role shift.

(a) *Overt subjects*

Person	No rs	Rs
First	34	12
Second	1	1
Third	64	5

(b) *Null subjects*

Person	No rs	Rs
First	18	3
Second	3	0
Third	27	3

Since Glück & Pfau (1998) have argued, following previous claims by Lillo-Martin (1986, 1991) for ASL, that null subjects in clauses with agreement verbs are licensed by agreement marking in DGS, it is worth evaluating whether the verbs in the examples containing null subjects displayed the predicted agreement marking. Out of the 48 examples with a null subject (and no role shift), 46 agreed or were congruent with the subject locus. There were just two examples with a null subject that were labeled 'incongruent'; both are displayed in (23).

(23) a. WAY$_a$ $\overline{\textbf{SHOW}_a}^{\text{'zeigen'}}$ O V
'[God] showed [me] this path.' [mst10-B-06:57.85]

b. $\overline{\textbf{TAKE1.NOT}}^{\text{hs}}$ \ $\overline{\text{MOTHER}\ {}_{a*}\textbf{TAKE1}_{b*}}^{\text{hs}}$ V \ S V
'She, the mother, wasn't even allowed to keep the children.'
[sh07-A-04:43.20]

The first exception (23a) 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 (23a) is clearly verbal – in the example, the accompanying mouthing is 'zeigen' ('to show') – it is evident that (23a) presents an atypical use of the verb SHOW.

30 As Table 8.6 shows, second-person subjects occurred only sporadically, so we can conclude very little about their subject-drop behavior.

The second counterexample is also nonstandard. The first instance of TAKE1 in (23b), 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 8.10, the movement displayed in the articulation of the sign diverges from its usual specification.[31] 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.

Fig. 8.10: A possible suppletive negative form of the verb TAKE1.

To sum up, subjects of all persons can be dropped in clauses with agreement verbs in DGS. When they are, the verb typically marks agreement. Thus, the data do not provide strong evidence *against* the claim that subject drop is licensed by agreement marking (cf. Lillo-Martin 1986, 1991; Glück & Pfau 1998). Chapter 9.4 compares the subject-drop patterns in clauses with agreement verbs to those with other verb types to establish whether the notion of agreement marking as a licensor of subject drop extends beyond agreement verbs to other verb types.

31 No other instances of TAKE.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.

8.5.2 Spatial verbs

In this section, the subject-drop patterns for the two subtypes of spatial verbs introduced in Section 8.3.2 are analyzed separately on the possibility that the patterns differ.

The properties of the subject in examples with GO1, GO2, or LEAVE (N=87) are tabulated in Table 8.7. As can be observed, subjects were often overt (N=56; 64.6%), but it is evident that they were 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 8.4.2, 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 6.4), 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 of those examples is illustrated in (24). 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.

Tab. 8.7: (a) Overt and (b) null subjects in clauses with the spatial verbs GO1, GO2, and LEAVE (N=87) in DGS.

(a) *Overt subjects*

Person	No rs	Rs
First	34	0
Second	3	0
Third	18	1

(b) *Null subjects*

Person	No rs	Rs
First	21	1
Second	1	0
Third	7	1

(24) CL():LIFT-UP \ **LEAVE**$_{a*}$ 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 8.8. Again, it can be observed that subject drop is commonly permitted. In fact, there were 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.

Tab. 8.8: (a) Overt and (b) null subjects in clauses with the spatial verbs THROW, BRING, and SEND1 (N=33) in DGS.

(a) *Overt subjects*

Person	No rs	Rs
First	6	0
Second	0	0
Third	6	0

(b) *Null subjects*

Person	No rs	Rs
First	14	1
Second	0	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 agreement verbs do. As such, different mechanisms that ensure the recovery of the subject's identity must be at work for spatial verbs than for agreement verbs (or other verb types). A formal analysis of spatial verbs taking this observation into account is presented in Chapter 10.

8.6 Summary

In this chapter, I investigated the morphosyntactic properties of regular agreement verbs and spatial verbs. Based on the discussion of their morphosyntactic properties in the previous sections, 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 agreement verbs that are presented in Chapters 10 and 11, respectively.

I showed that regular agreement verbs have a preference for SOV order, although SVO order is also quite common. This result is in line with previous studies on agreement verbs in DGS (e.g. Bross & Hole 2017; Steinbach & Herrmann 2013; Pfau, Salzmann & Steinbach 2018). 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 agreement 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.

Agreement verbs almost always align their initial and final places of articulation with their subject and object, suggesting that agreement marking is obligatory.[32] This is a remarkable finding, as agreement marking has typically been considered to be optional in many sign languages. The few counterexamples that were attested need alternative explanations; this still requires some further investigation.

Spatial verbs, on the other hand, display 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 not always been overtly 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. In other words, 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 place 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 can freely be dropped with agreement as well as with spatial verbs. However, while the data overall support the notion that subject drop with regular agreement 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 11, I argue that agreement verbs formally agree with both their arguments, while spatial verbs do not. For the latter verb type, I propose in Chapter 10 that they have a demonstration component which loosens the restrictions on both verb modification as well as subject drop.

32 Backward verbs, of course, display the reverse pattern.

9 Synthesis: morphosyntactic properties

This chapter presents a comparison of the morphosyntactic properties of body-anchored, neutral, agreement, and spatial verbs in German Sign Language (DGS), as they were described in Chapters 6 to 8.

In Section 9.1, 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 9.2 discusses how verb types may differ from each other in terms of valency patterns. Section 9.3 focuses on the realization of agreement properties across different verb types. In Section 9.4, I statistically analyze subject-drop patterns with the different verb types. Collectively, the results in these sections provide the foundation for the theoretical analyses of DGS lexical verbal constructions in Chapters 10 and 11.

9.1 Presence and position of arguments

This section analyzes which positions different kinds of arguments (plus locative adjuncts) may occupy relative to the verb, depending on verb type. First, I determine how often arguments are overtly realized in clauses with verbs of different types.

Table 9.1 indicates, for each verb type, the proportion of main clauses that contain the specified combinations of arguments.[1] 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 9.1 that between 15 and 20% of clauses with body-anchored, agreement, and spatial verbs do not contain any overt arguments at all. For neutral verbs, that percentage is even higher: 28.8% of neutral-verb constructions do not contain any overt arguments. This observation raises questions about the recoverability of null arguments in constructions with neutral verbs. Sections 9.3 and 9.4 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 contain only a (surface) subject. When clauses that include a subject as well as one or more other arguments (e.g. O) are also taken into ac-

1 I include locative constituents in the table, although I argue against the notion 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.

https://doi.org/10.1515/9783110742787-009

Tab. 9.1: Frequencies of different combinations of overt arguments and locative adjuncts in clauses with verbs of different types in the DGS corpus data, in percentages.

Arguments	Body-anchored	Neutral	Agreement	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

count, 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 agreement verbs (68.4%) and neutral verbs (61.0%), with spatial verbs taking a subject least often (55.1%). Section 9.4 presents a statistical analysis of subject-drop patterns across verb types.

Clauses with agreement 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.[2] Since agreement 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 agreement verbs do *not* contain an overt direct object, which means that object drop must be common.[3] 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 containing 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 argu-

2 These percentages have been calculated by pooling together the categories 'O' and 'S + O' in Table 9.1, in addition to categories collapsed under 'Other' that include a direct object.

3 Overt indirect objects are also very uncommon with agreement verbs; just 6.4% of the clauses with agreement verbs include an indirect object. The examples do not show up in Table 9.1 because they are all subsumed under the 'other' category.

ment.[4] 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.[5]

Firstly, Table 9.2 represents frequency information on the position of the subject relative to the verb.[6] 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.

Tab. 9.2: Position of the subject relative to the verb across verb types, in percentages.

Order	Body-anchored	Neutral	Agreement	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

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. 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).[7] These forms have in common that

4 Indeed, in Chapter 10, 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.

5 There were too few examples with indirect objects in the data set to analyze them properly; I thus leave them out of the discussion.

6 In the calculations for neutral verbs, I treat arguments labeled S/O, i.e. the more subject-like arguments of symmetric verbs, like regular subjects. Similarly, O/S arguments are treated as direct objects below.

7 It needs to be remarked, however, that these four verb forms also generally occur quite frequently in the data compared to many other body-anchored verb forms. Thus, further research is necessary

they have a place of articulation on the signer's head. Perhaps, then, there is a phonological preference for downward rather than upward articulatory 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 9.3, the direct object favors a preverbal position with all verb types except for body-anchored verbs, which prefer postverbal objects.[8] I should point out, however, that the preverbal preference for objects in constructions with agreement 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 there are just 26 examples with neutral verbs that include an overt direct object.

Tab. 9.3: Position of the direct object relative to the verb across verb types, in percentages.

Order	Body-anchored	Neutral	Agreement	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 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).

to determine whether the relative high frequency of V S orders with these verbs reflects a genuine pattern.

8 Note also that O \ V is included as a separate order in Table 9.3. For such clauses with a sentence-initial direct object followed by a prosodic boundary, it is likely that topicalization has occurred.

The frequency data regarding the position of embedded clauses (abbreviated CO for 'clausal object', following the annotation guidelines for the corpus data) in relation to the verb are displayed in Table 9.4. There are few surprises here; only (some) body-anchored verbs and agreement verbs may take clausal complements, and such complements tend to follow rather than precede the main verb.

Tab. 9.4: Position of the clausal complement relative to the verb across verb types, in percentages.

Order	Body-anchored	Neutral	Agreement	Spatial
V CO	87.0	-	91.0	-
CO V	8.4	-	4.5	-
Sandwich	4.6	-	4.5	-
	100	100	100	100

Finally, Table 9.5 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.

Tab. 9.5: Position of the locative constituent relative to the verb across verb types, in percentages.

Order	Body-anchored	Neutral	Agreement	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 preferred 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 9.3), 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.

9.2 Valency

The results reported in Chapters 6.3, 7.3, and 8.3 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 take clausal complements.

Neutral verbs show a similar degree of 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 – all neutral verbs – do not take any arguments.

Unsurprisingly, agreement verbs show more uniform behavior, since they express double-argument agreement. All regular agreement verbs are transitive or ditransitive, with some verbs allowing clausal complements. The corpus data indicate that the ditransitive verbs in the data set may also be used monotransitively, 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.

Finally, 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 agreement verbs are at least bivalent – there is no strong relation between valency and verb type. Indeed, this corresponds well with the observation made in Chapter 5 of this book that verb type is correlated with dimension, not degree, of transitivity.

9.3 Locus alignment

As discussed at various points throughout this work, the potential for modification of (some) verbs in sign languages to mark agreement with their arguments has been a popular research topic for decades, and it has also motivated Padden's (1988) classic tripartite classification of verbs in American Sign Language.

For the verb types that have the potential to be modified, i.e. neutral, agreement, 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 agreement verbs express genuine agreement or merely 'indicate' their arguments; (ii) should a principled distinction be made between spatial verbs and agreement verbs; (iii) should the localization of neutral verbs be considered an expression of agreement?[9] What can the analysis of the DGS corpus data contribute to these debates?

In the data, regular agreement 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, Johnston & Schembri 2009; Fenlon, Schembri & Cormier 2018; Legeland 2016), I only found a handful of examples in the DGS data where the place of articulation of the verb was clearly incongruent with that of the referent it was expected to align with.

All together, 92.4% of all agreement 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, Johnston & Schembri (2009) and Fenlon, Schembri & Cormier (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, Schembri & Cormier (2018) is that third-person agreement marking in BSL is rarer than first-person (as well as second-person) agreement marking.[10] 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 with a first-person subject,

9 I refer the reader back to Chapters 7.1 and 8.1 for more thorough discussions of the relevant literature.

10 This 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 11.

although the effect should not be overstated.[11] Of the clauses with an agreement 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 subject was not localized).

Overall, with so few verb tokens that clearly do not align 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 agreement 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 7.4, very few instances of clauses with neutral verbs show unambiguous localization. The only verb form that regularly localizes at a distinct R-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 take an external argument, which is typically 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, typically being associated with the center of the signing space instead. 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 7.4, 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

11 I only consider subject agreement marking, as I did not make annotations that indicate grammatical person of the object.

such examples is attested in the corpus; two of them are repeated in (1).[12] Such examples were confirmed to be grammatical by two DGS informants.

(1) a. **COOK1**$_a$ HOW V
‘How does [he] cook?’ [hh01-B-07:11.25]
b. INDEX$_1$ 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 agreement 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 & Wilbur (2018) based on data from Brazilian Sign Language (Libras), and it is a perspective which is incorporated into the formal analysis of neutral verb constructions in Chapter 11.3.

Finally, spatial verbs behave quite differently from agreement verbs and neutral verbs in terms of their locus alignment properties. I discussed in Chapter 8 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 was not previously introduced into 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:

12 Note that in (1b), the localization of both instances of COOK1 appears to serve to express a direct contrast.

with agreement verbs, object marking occurs at the verb's final location. Backward agreement 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 10, 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 Quadros & Quer (2008) have argued for – there are morphosyntactic grounds for making a principled distinction between spatial and agreement 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 10, in which I also present a number of additional arguments in support of the conclusion that spatial verbs should be treated as a distinct verb type.

9.4 Subject drop

All verb types allow for subject drop. As Table 9.6 shows, body-anchored, neutral, and agreement 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 10, 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 agreement verbs. Spatial verbs, of either subcategory, are not discussed any further in this section.

Tab. 9.6: 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%)
Agreement	117 (68.4%)	54 (31.6%)
Spatial: GO1, GO2, LEAVE …	56 (64.4%)	31 (35.6%)
Spatial: BRING, THROW, SEND1 …	12 (36.4%)	21 (63.6%)

Table 9.7 compares body-anchored, neutral, and agreement verbs with respect to the distribution of overt and null subjects across grammatical person.[13] 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.

Tab. 9.7: (a) Overt and (b) null subjects of different persons in clauses with body-anchored, neutral, and agreement verbs.

(a) *Overt subjects*

Person	Body	Neut.	Agr.
First	175	40	34
Second	36	6	1
Third	135	61	64
	346	107	99

(b) *Null subjects*

Person	Body	Neut.	Agr.
First	105	33	18
Second	8	4	3
Third	10	20	27
	123	57	48

The raw numbers in Table 9.7 already show a difference in absolute numbers for null third-person subjects in constructions with body-anchored (N=10) versus neutral (N=20) or agreement (N=27) verbs. Indeed, this difference becomes even more pronounced when one considers that there are overall more examples with body-anchored verbs (N=469) than with neutral (N=164) and agreement 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 occur-

13 The examples with the hybrid verbs SEE, HUG1, and SMELL1, classified as agreement verbs, are excluded from counts in the table, because they are hybrid forms with 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.

rence of third-person subject drop with body-anchored verbs are, indeed, significantly lower than with neutral and agreement verbs.[14] 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.[15]
– In clauses with neutral and agreement verbs, in the absence of role shift, subjects of any person can be non-overt.

For neutral verbs and agreement 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 11.2 and 11.3, 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. Meier 1990; Engberg-Pedersen 1993; Rathmann & Mathur 2002; Hou & Meier 2018) have claimed that sign languages only make a first versus non-first person distinction, as non-first person referents can, in principle, be localized anywhere in the signing space.[16] 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 6.4, scrutiny of the relevant examples reveals that null second-person subjects do occur, but only in interrogative constructions, which I tentatively concluded are independent licensers 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 11.1.7 after I have set out my general formal account for body-anchored verb constructions.

The prediction in 9.4 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 phe-

14 A similar statistical analysis was applied – both to DGS and RSL – in Oomen & Kimmelman (2019), although agreement 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 chapter, as well. Part of the text that follows in this section also appears in a slightly altered version in Oomen & Kimmelman (2019).

15 Second person is discussed below.

16 See also Alibašić Ciciliani & Wilbur (2006) for an alternative theory.

nomenon, 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 et al. 2015). Specifically, I created a model to predict the occurrence of non-overt third person subjects, which I label 3N (as opposed to any other options), based on verb type. I first set up contrasts between agreement verbs (+1/2) and neutral verbs (-1/2), as well as between body-anchored (-1/3) vs. agreement (+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).

(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 agreement 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 6.4, I conclude that null non-first person subjects with body-anchored verbs are disallowed, while they are perfectly fine with neutral and agreement verbs. This conclusion plays an important role in the formal analysis I propose in Chapter 11, in which I present a unified account of body-anchored, agreement, and neutral verbs based on the idea that each of these verb types involves grammatical agreement.

Part IV: **Theoretical analysis and implications**

10 Spatial verbs are demonstration verbs

In Chapter 9, I systematically compared the main findings for each of the verb types previously discussed in Chapters 6 to 8. The discussion showed that – despite there being notable differences – body-anchored, neutral, and regular agreement verbs share a number of important properties, whereas spatial verbs stand out in several respects. I therefore propose a separate analysis for the latter verb type in this chapter.[1] The other three verb types receive a joint analysis in Chapter 11.

While Padden (1988) makes an original distinction between agreement 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 (Janis 1992, 1995; Quadros & Quer 2008) 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, Quadros & Quer (2008) point out that some verbs are 'fuzzy' in that they may sometimes agree with locations, and sometimes with referents (also see Kwok, Berk & Lillo-Martin 2020).

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 agreement 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 discussion 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 10.1, I show which properties of spatial verbs lead me to propose in Section 10.2 that these verbs involve demonstration, causing a relaxation of certain grammatical rules that do apply to agreement verbs. In Section 10.3, I additionally argue that the strength of a verb's demonstration component may be different for different spatial verbs, which leads me to propose a demonstration continuum on which spatial verb forms take an intermediate position between fully conventionalized lexical verbs and productive classifier predicates. Section 10.4 concludes the chapter.

1 A version of this chapter has also been published as: Oomen, Marloes. 2020. Spatial verbs are demonstration verbs. *Revista Linguística* 16(1). 227–249.

https://doi.org/10.1515/9783110742787-010

10.1 Properties of spatial verbs

As I discussed in Chapter 8, the six spatial verbs in the DGS data set can be divided into two categories based on several morphosyntactic 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 10.2 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 more like classifier predicates.[2] 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 Chapter 4 demonstrated that 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.[3]

Furthermore, there is variation attested in hand orientation. The verb BRING, 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 10.1; the example in which the verb occurs is represented in (1), reproduced from (20) in Chapter 8.4.2.

(1) WITH POSS$_1$ CHILD++$_a$ CLEAR POSS$_1$ $_a$**BRING**$_{b*}$ — O V
‘[I] would take my children with me.’ [koe20-A-04:35.60]

2 Note that in 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 a general label used for classifier predicates.

3 An alternative analysis for SEND1 is that it is actually used gesturally, as in some hearing cultures. I put this issue aside for now.

Fig. 10.1: 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 10.1: 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 finding discussed in Chapter 8.4.2 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 agreement verbs, as it applies to the spatial verbs GO1, GO2, and LEAVE, too. 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.

To recapitulate, BRING, THROW, and SEND1 frequently start their trajectory at a locus associated with a patientive referent, which may be analyzed as a direct object. This is noteworthy in itself, since it contrasts with the behavior of agreement verbs, but even more interesting is that there are other options available. 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 10.2.[4]

(2) a. DRESS **THROW**$_{a*}$
'I put away the dress.' [koe17b-A-01:46.55]

b. POSS1 FATHER WANT \ INDEX$_1$ $_1$**SEND1**$_{a*}$ HIGH SCHOOL
'My father wanted to send me off to college.' [mst16-B-01:41.85]

(a) THROW$_{a*}$ from (2a).

(b) SEND1$_{a*}$ from (2b).

Fig. 10.2: The final places of articulation of the verbs in the examples in (2).

However, it also seems possible for the final place of articulation to correspond to 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 just a handful of such instances.[5] 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 10.3a, 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.[6] Example (3b) looks similar to (3a): the final place of

4 Recall that in the examples in (2), the star following the locus subscript indicates that the locus is newly introduced.

5 In such cases, one might argue that such a spatial verb token 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 10.2.

6 Another 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 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 10.3b illustrates the final place of articulation of the sign, which is again higher up in the signing space than usual.[7]

(3) a. INDEX$_a$ $_{(a)}$**BRING**$_b$ INDEX$_b$
‘He took [everything] with him to there [America].’ [koe05-03:39.10]

b. $\overline{\text{INDEX}_a \text{ PRODUCTION DONE}}^{\text{re}}$ \ $_a$RETURN$_b$ [...] INDEX$_a$ WITH $_a$**SEND1**$_b$
‘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]

(a) $_{(a)}$BRING$_b$ from (3a). **(b)** $_a$SEND1$_b$ from (3b).

Fig. 10.3: The final places of articulation of the verbs in the examples in (3).

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

tend not to use an absolute (i.e. geocentric) frame of reference when making reference to spatial relations.

7 In establishing the final place of articulation of the sign, I only considered the signer’s dominant hand, which is his right hand (left in Figure 10.3b).

to show alignment with a (non-first person) subject locus, again illustrating that there is flexibility in the strategies signers may adopt.

Several such options are illustrated in the constructed examples in (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.[8] 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 in terms of what the path movement of spatial verbs may convey.[9] As it happens, Quadros and Quer (2008) describe similar patterns for Brazilian Sign Language (Libras); the observation that (some) spatial verbs may sometimes align with referent loci in fact leads them to conclude that there is no clear-cut distinction between agreement 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

8 Again, an alternative possibility is that that the signer takes geographical knowledge into account when deciding where to end a spatial verb's trajectory. Still, it appears that the signer does not *have* to make use of absolute space in order for the construction to be interpretable.

9 In fact, it is not clear if the beginning and end points necessarily need to convey anything overly semantically specific. It has previously been argued by many that spatial verbs express agreement with semantically meaningful locations; specifically, locations that correspond to the source and goal of motion (Fischer & Gough 1978; Meir 1998, 2002). However, almost all tokens of GO1, GO2, and LEAVE start from the same place of articulation – somewhat toward the signer's ipsilateral side – thus making it implausible that this location is necessarily semantically meaningful in this way. As discussed, in many other cases, and across all six spatial verb forms, the final place of articulation did not appear to be clearly motivated other than that it represents a location being (far or less far) away from the signer.

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 Quadros & 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 Quadros & 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. This insight is worked out in detail in the next section.

10.2 Spatial verbs are demonstration verbs

Based on the observations discussed in the previous section, I propose that DGS spatial verbs fall somewhere in between fully conventionalized lexical signs – which in DGS would include body-anchored, neutral, and regular agreement verbs – and fully productive signs, i.e. classifier predicates. BRING, THROW, and (possibly) SEND1 can be said to occur more toward the productive end of the scale, while GO1, GO2, and LEAVE fit somewhere in the middle (see Section 10.3 for further elaboration on this point). As I explain below, the degree of demonstration involved and the strength of grammatical rules, which trade off with each other, determine the positioning of the different verb forms.

I argue that the flexibility that spatial verbs in DGS show indicates that the path movement is a non-conventionalized demonstration of movement from one place to another (following Davidson 2015 discussed further below).[10] The path movement in agreement verbs, on the other hand, has the purely grammatical function of marking agreement. In fact, a similar perspective is expressed by Padden (1990: p. 123), who claims for American Sign Language (ASL) that "agreement verbs have certain spatial restrictions that do not apply to spatial verbs", and it is also in line with Pfau, Salzmann & Steinbach (2018: p. 18), who state: "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

10 The story is somewhat more nuanced than this, as the concept of 'demonstration' should be considered a gradient notion. That is, verb types, or indeed individual verb forms, can be placed on a scale based on the strength of their demonstration component. The demonstration component in spatial verbs in DGS would be of moderate strength, but this might be different in other sign languages; see Section 10.3 for further discussion.

literal movement frequently fails, namely in those cases where the verb does not denote transfer".

More specifically, I argue that spatial verbs demonstrate movement from a to b, where a and b represent locations which may be specified to different degrees, depending on pragmatic considerations (see below). The loci in the signing space representing these locations may be determined randomly or (partially) based on geographical knowledge, but they might also simply reflect a position relative to the signer (close by or far away), or represent a location previously assigned to a discourse referent (i.e. an R-locus).

Two questions have to be addressed:

(i) What does demonstration mean in linguistic terms?
(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 (3), both quotations (3a) (Davidson 2015: p. 487) and classifier predicates (3b) (Davidson 2015: p. 495) take a demonstration component, 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 (3b) 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.

(3) 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 is readily applicable to spatial verbs in DGS. Indeed, as pointed out in the previous section, the verb forms BRING and THROW, which involve classifier handshapes, look very much like classifiers already.[11] But the

11 SEND1 involves a hand-to-hand mapping (see Chapter 4.5.2), and could thus be analyzed as having a body-part classifier handshape.

analysis applies equally well to the other spatial verb forms: 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 discussed in Section 10.1, there are multiple options available to signers.

How, then, does a signer choose among the various options 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 at the same time providing no more information than strictly necessary. For instance, if a signer only deems it relevant to convey that a certain referent visited a certain place, e.g. a bar, but not so much (i) which location that person came from, or (ii) what the absolute location of the bar is, then the spatial verb will probably be articulated with a path movement from somewhere close to the signer to a location 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 had already 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 argue against analyzing instances like the latter as expressions of agreement: under the assumption, following Schlenker (2018a), that person loci are a fusion of both a spatial location and a more abstract grammatical element, it can be argued that these 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 person 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 this should be different for spatial verbs.

If a spatial verb's movement 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 10.1 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 were 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 2018 for Russian Sign Language). Building on Davidson (2015), Kimmelman (2018a) 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.[12] The demonstration aspect may then allow for the recovery of this agent even if there is no agreement marking.

I propose that a similar analysis is applicable to spatial verbs in DGS. Recall that the verbs GO1, GO2, and LEAVE occur with null subjects less often than the verbs THROW, BRING, and SEND1. I suggest 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.

Of course, the present study only includes a small set of six prototypical spatial verb forms; further work is needed to study the properties of a larger set of spatial verb forms in DGS, in particular in order to establish whether they indeed also involve the sorts of demonstration components described above, as well as demonstrate a relaxation of the rules on subject drop.

To sum up this section, I have argued that spatial verbs involve a demonstration component which loosens the restrictions both on locus alignment and subject drop. That is, 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 positioned somewhere in the middle between conventionalized

12 I should note that both Glück & Pfau (1998) and Kimmelman (2018a) 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 et al., 2019).

lexical verbs and productive signs more akin to classifier predicates. In the next section, I reflect on the wider implications of this proposal.

10.3 A demonstration continuum

While the account presented in the previous section has been proposed specifically for spatial verbs in DGS, it may apply to spatial verbs in other sign languages as well. It is important to note in this regard that every sign language must be investigated on an individual basis, since the properties of spatial verbs, as well as agreement verbs, may differ from language to language, thus possibly leading to different overall conclusions. Let us therefore entertain here which circumstances would argue for or against the analysis presented here for spatial verbs in DGS, so as to facilitate future work into the matter.

The situation in DGS can be visualized as in Figure 10.4.

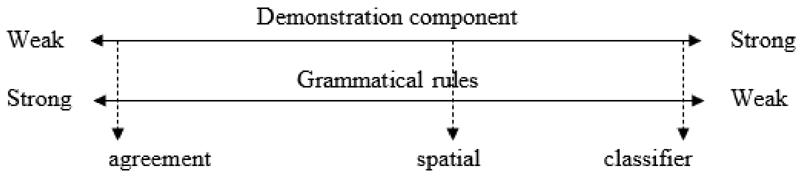


Fig. 10.4: DGS verb types on a demonstration continuum.

I have argued that spatial verbs in DGS have a fairly strong demonstration component while they do not appear to be constrained by strict grammatical rules when it comes to agreement marking or null subject licensing. As visualized in Figure 10.4, these two factors are inversely related to one another: predicates that demonstrate more, are less constrained in their grammatical behavior; rather, their form is to a greater extent determined pragmatically. Conventionalized lexical predicates would be situated on the left side of the continuum. Now, as shown previously in Chapter 8, agreement verbs in DGS virtually always align with their arguments, such that a case can be made that agreement marking on these verbs licenses subject drop in DGS (also see Chapter 11). This justifies a positioning of agreement verbs on the left side of the continuums in Figure 10.4. Classifier predicates, which may productively adapt their movement, location, and, to a lesser extent, handshape, would be situated on the opposite end of the scale. Finally, as argued extensively in this paper, the properties of the spatial verbs in the data set indicate that they are somewhere in the middle between lexical verbs and non-conventionalized classifier predicates, with the forms BRING, THROW, and SEND1 having a somewhat stronger demonstration component than GO1, GO2, and LEAVE.

While a distinction between agreement verbs and spatial verbs is warranted for DGS, it might not necessarily be appropriate for other sign languages. For instance, in languages such as Australian Sign Language (de Beuzeville, Johnston & Schembri 2009) and British Sign Language (Fenlon, Schembri & Cormier 2018), for which it has been shown that agreement marking on agreement verbs is only optional, a distinction between agreement and spatial verbs in these languages might be less well motivated. For those languages, it could be investigated whether there are other qualitative differences between the two verb types, such as (lack of) licensing restrictions on subject drop, or the extent to which verb forms can be modified in classifier-like ways, as discussed above for spatial verbs. In other words, it is possible that in some sign languages, agreement verbs have a stronger demonstration component than they do in DGS – perhaps even to the extent that they can be grouped together with spatial verbs. This situation is visualized in Figure 10.5.

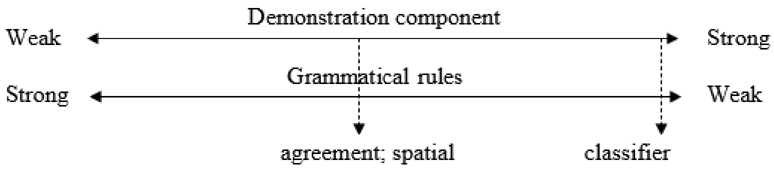


Fig. 10.5: Verb types on the demonstration continuum of a hypothetical sign language with verb-type properties differing from those of DGS.

Of course, it is equally possible that there are sign languages in which spatial verbs have a weaker demonstration component and display more conventionalized grammatical behavior compared to DGS. For such languages, it may then be argued that spatial verbs lean more strongly toward the lexical side of the scale. In other words, such languages would have a broader class of lexical predicates. It is presently unclear whether such sign languages exist, given that the properties of spatial verbs have generally not been studied as thoroughly as those of agreement verbs, but it seems that Libras is a potential candidate.[13] As noted, Quadros & Quer (2008) provide evidence that null subjects in spatial verb constructions in Libras are licensed through agreement, which is in direct opposition to what I propose in this paper for DGS, based on the results of the corpus study. Thus, studying both alignment and the (lack of) constraints on argument drop is vital to assess whether and to what extent spatial verbs in other sign languages also involve demonstration. In general, the principle that is proposed to apply is that the less constrained the behavior of (spatial) verbs is in a sign language, the more compatible it would be with a demonstration account.

As a final note, let me point out that I have talked about verb classes as if they can be so rigidly defined. However, it may very well be the case that there are differences between individual verb forms within a presumed verb class. Consider the differences between GO1, GO2, and LEAVE vs. BRING, THROW, and SEND1 that were described in Chapter 8 and Section 10.1 in this chapter: it seems reasonable to argue that the former three verbs lean more toward the left side of the continuum presented in 10.4, while the latter, behaving rather more classifier-like, lean more toward the right. I see much potential for further study in this domain.

10.4 Conclusion

To conclude, I have argued in this chapter that spatial verbs in DGS should be treated as a distinct verb category (contra Quadros & Quer 2008 for Libras), even though they have some overlapping properties with agreement 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 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 pragmatically, respecting the Gricean Maxim of Quantity. That is, signers will only provide information about locations or referents 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.

13 Let me point out here that Padden (1990) makes a number of observations for ASL which seem in line with the situation I describe for DGS.

In principle, the analysis should be applicable to all verbs that show flexible behavior in their specifications for movement and location, as well as handshape. 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.

In the next chapter, I provide a theoretical account for the verb types that were shown in the corpus data to display more conventionalized behavior, which I will argue to justify a unified analysis in terms of agreement.

11 A unified analysis in terms of agreement

In this chapter, I develop a unified analysis of body-anchored, neutral, and agreement verbs. The goal is to tie together all the separate lines of investigation set out in Parts II and III by developing formal accounts that can capture as much of the individual properties of the three different verb types as possible. The primary motivation for attempting such a feat is that the boundaries between the three verb types are demonstrably obscure — 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 book.

Based on the description of the morphosyntactic properties of body-anchored (Chapter 6), neutral (Chapter 7) and regular agreement verbs (Chapter 8; also see the systematic comparison of the properties of these verb types in Chapter 9), I argue in this chapter that all of these verb types grammatically agree 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. More specifically, I propose that:

(i) Agreement 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) Agreement 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.

https://doi.org/10.1515/9783110742787-011

In the next sections, I develop the formal account step-by-step. I start with body-anchored verb constructions (Section 11.1), as the iconicity effect that I have argued is triggered by body-anchoring motivates the introduction of a certain formal apparatus. The analyses for agreement verbs (Section 11.2) and neutral verbs (Section 11.3) build on this account. Section 11.4 discusses some outstanding issues related to the formal analysis presented in this chapter. Section 11.5 summarizes the chapter.

11.1 An agreement analysis of body-anchored verbs

In the analysis of body-anchored verb constructions, the main observation I will attempt to account for is that iconically-motivated body-anchored verbs appear to trigger a first-person interpretation in the absence of an overt subject (see Chapters 6.4 and 9.4).[1] 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.

11.1.1 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 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

1 This section is an adaptation of part of a previously published article with Vadim Kimmelman (Oomen & Kimmelman 2019). For consistency, I continue to use the pronoun 'I' in this chapter.

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.[2] Moreover, person marking in sign languages differs from person marking in spoken languages (see Chapter 1.1.2), and I will argue that these differences also translate into different feature specifications (Section 11.1.3). In relation to this point, although additional data is needed for verification, I argue that the restriction on subject drop applies to both second- and third-person (i.e. non-first person) subjects. 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 11.1.7 for further discussion). I thus conclude that DGS cannot be analyzed as a partial null-subject language.

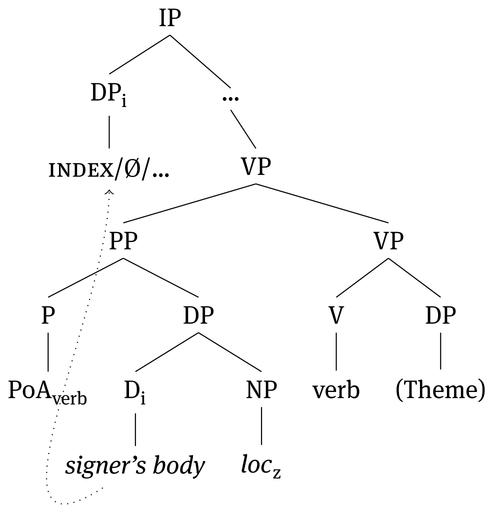
Lillo-Martin (1986, 1991) proposes for ASL that null arguments with plain verbs – which include body-anchored verbs – are variables which are licensed by being bound by an empty topic (see Chapter 1.1.5), while agreement verbs have the additional option of licensing null arguments through agreement marking. 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 participants typically gaze toward the addressee during the articulation of a plain verb.

As discussed in Chapter 6.1.2, I found in Oomen (2017) that null third-person subjects with psych-verbs – a subset of body-anchored verbs – are dispreferred in Sign Language of the Netherlands (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

2 Note 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.

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 represented 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 & 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 agreement, 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 11.1.4.

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 6.1.1, 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 agreement verbs, where it encodes first person instead of subject. This means that the change from body-anchored into agreement forms, as Meir et al. (2007) report for several verb forms in Israeli Sign Language and Pfau, Salzmann & Steinbach (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, which begins by determining what kind of person features are involved in DGS.

11.1.2 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 (a.o. Lillo-Martin & Klima 1990). 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.[3] Conversely, the same referent can be associated with different R-loci in different conversations.[4]

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. Meier 1990; Engberg-Pedersen 1993; Rathmann & Mathur 2002; Hou & Meier 2018). 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 & 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 & Onea (2016) in positing an abstract R/L-feature for non-speaker referents with a semantics of reference tracking. Steinbach & 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, an 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 & 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

3 It 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.

4 In fact, R-loci may even change within a discourse, as in the case of role shift, for example.

11.1.7; for now, it suffices to say that I assume no formal distinction between second and third person.

Steinbach & 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 & 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.

11.1.3 Inherent and interpretable features

As preluded 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 & 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 & 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. Sauerland 2004; Steriopolo & Wiltschko 2010; Ackema & Neeleman

2013; Matushansky 2013), which I will show in Section 11.1.4 to bear compelling parallels to referent mismatch in DGS.

We may now determine which feature values are specified on subjects and verbs in DGS.[5] An overview of the feature specifications of subjects and body-anchored verbs is presented in Table 11.1.

Tab. 11.1: 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]] …	–	– *or* [[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 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 INDEX$_1$ 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

5 Technically, 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 11.1.5.

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 & 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 11.1.4).

Finally, null arguments do not have a formal feature specification (indicated in Table 11.1 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 11.1.6 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 articulation on the body. Thus, whereas Pesetsky & 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.

11.1.4 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., Sauerland 2004; Steriopolo & Wiltschko 2010; Ackema & Neeleman 2013), 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.[6]

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.'					

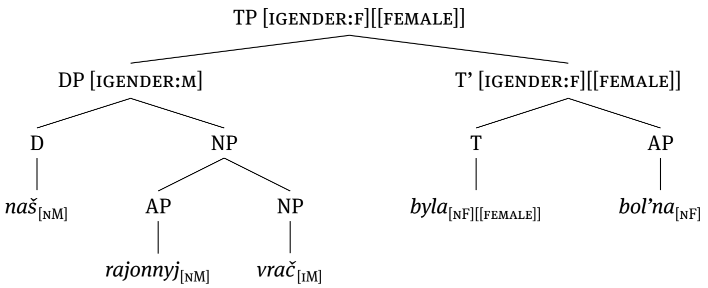
Matushansky (2013) proposes that agreement markers on verbs with non-inherent feature specifications, like the copula *byla* in (5), can be endowed with semantic features as a last-resort strategy to yield the correct semantic interpretation. In her system, instances of features that are non-inherent 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

6 Nonetheless, 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.

due to the presence of an interpretable feature, which, as described above, may be introduced as a last resort.[7] 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 inserted 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.

7 As such, Matushansky (2013) diverges from Pesetsky & 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).

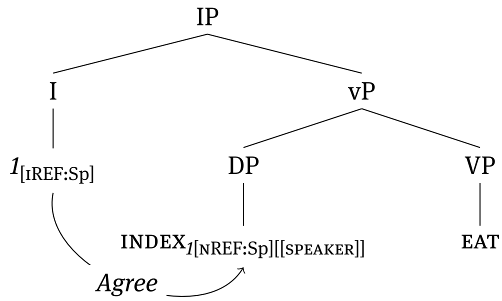
Crucially, in the case of a null subject, which does not come equipped with a semantic feature, the body-anchored verb will be specified with a semantic speaker feature as a last-resort strategy to ensure interpretation of the null subject referent. This is quite unlike any mechanism Matushansky describes, 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.

11.1.5 Structural representations

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 11.4.1 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.

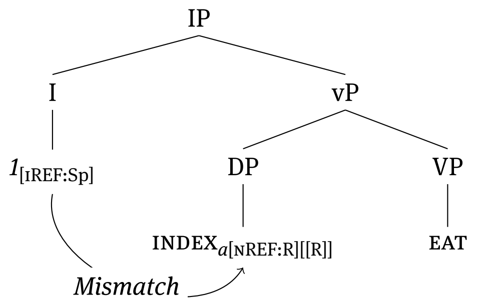
(7) 'I ate.'



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, '*1*' in the I-head indicates marking of the first-person locus, i.e. the signer, through body-anchoring. The pronominal subject INDEX$_1$ is located in the specifier of the vP and bears a non-inherent speaker-feature [NREF:Sp] as well as an interpretable [[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 11.4.1 for further discussion.

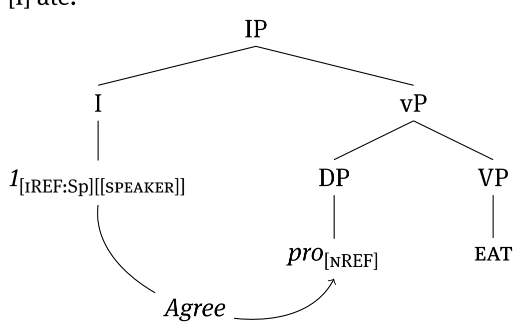
The structure for clauses with a non-first person referent and a body-anchored verb – the mismatch scenario – is illustrated in (8). The structure is identical to the one with a first-person subject in (7), with the exception of the features that are specified on the subject. While there is a mismatch 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 [[SPEAKER]]. The non-inherent feature on *pro* gets valued through checking, resulting in a first-person interpretation of the null subject.

(9) ‘[I] ate.’

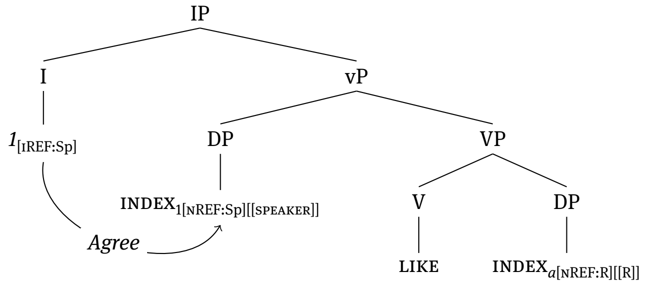


The account I have proposed above rests on the assumption that body-anchored verbs are first-person forms. An interesting question worth entertaining is whether this holds for all body-anchored verbs, or only for those that are iconically motivated. While we can only speculate at this point, given that 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.[8] Further testing is needed.

11.1.6 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.[9] 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.

(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 11.2.2 on hybrid forms, as well as Section 11.4.2 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 11.4.3, I

8 The Russian Sign Language (RSL) data analyzed in Oomen & 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.

9 The object’s non-inherent feature gets licensed by its interpretable feature, which is one of two strategies to license non-inherent features according to Matushansky (2013).

briefly entertain some of the possible analyses to guide such potential follow-up research.

11.1.7 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, such as in (11), reproduced from (21) in Chapter 6.4.

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

As discussed in Chapter 6.4, most of these counterexamples have in common that they are questions to the addressee.[10] Crucially, such questions are marked 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 can 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).

10 Two counterexamples are not questions, but these both have other non-canonical properties which lead me to conclude that they do not form real counterexamples; see Chapter 6.4 for discussion.

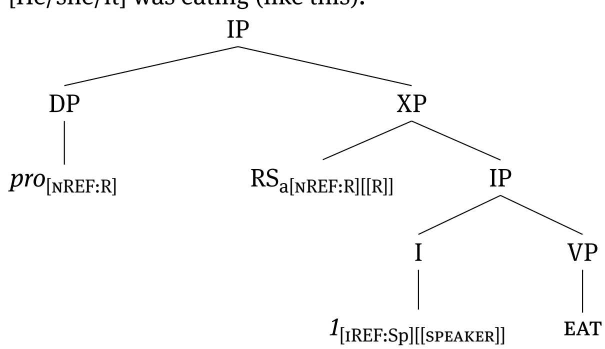
11.1.8 Role shift

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 (Quer 2011; Lillo-Martin 1995; 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 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.

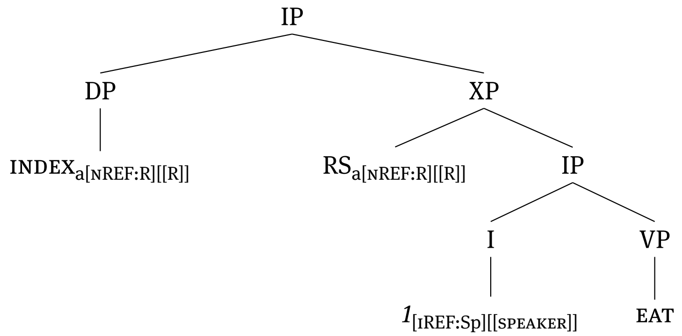
A syntactic analysis for the null-subject case is presented in (12). Within the scope of the role shift, we have a body-anchored verb forcing a first-person interpretation, as in (9) above. The role shift is an operator producing context shift, such that the reference to the speaker in the shifted context 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). The formula expresses that the [[SPEAKER]]-value under role shift will be interpreted with respect to the modified context <s(i), w>, 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,
$[\![RS_i\ VP]\!]^{c,s,w} = [\![VP]\!]^{<s(i),\, w>,s,w}$.

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.

11.1.9 Interim conclusions

I have 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 (Chapter 9.4). 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 that overrides formal features.

The 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.[11] 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

11 I 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.

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.

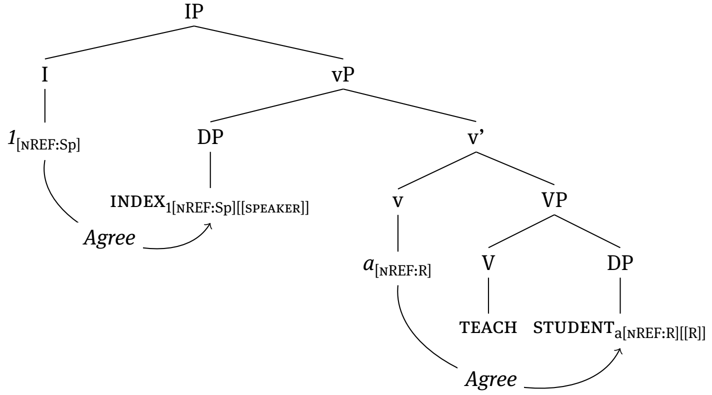
In the next sections, I account for sentences with agreement verbs (Section 11.2) and neutral verbs (Section 11.3) by making use of the same general mechanics as for body-anchored verb constructions, resulting in a unified account of constructions with verbs of all three types.

11.2 Accounting for agreement verbs

In Chapter 8, I showed that both subject and object marking on regular agreement verbs occurred systematically in the corpus data. Agreement marking can thus be said to be obligatory in DGS, in contrast to what has been reported for a host of other sign languages (see Chapter 8.1.2 for a literature overview). This means that there is no need for the formal analysis for agreement verbs to account for optionality of agreement marking.

The account I propose for agreement verbs preserves the main elements from the analysis of body-anchored verb constructions, but should additionally reflect that agreement 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 agreement verb and two arguments is represented in (15).

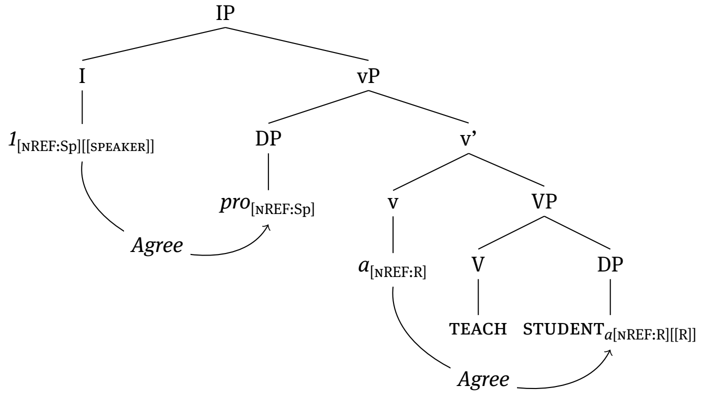
(15) ‘I’m teaching a student.’



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 11.1.3. 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 agreement verb with the loci of its subject and object results from movement operations of the verb in the V-head; see Section 11.4.1 for further discussion.[12]

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. In contrast to body-anchored verbs, agreement verbs are not restricted in terms of which referent features they may take, as reflected by the fact that these verbs can be modified to align with referent locations of any person. The structure of an example with a null subject is represented in (16).

(16) '[I] am teaching a student.'



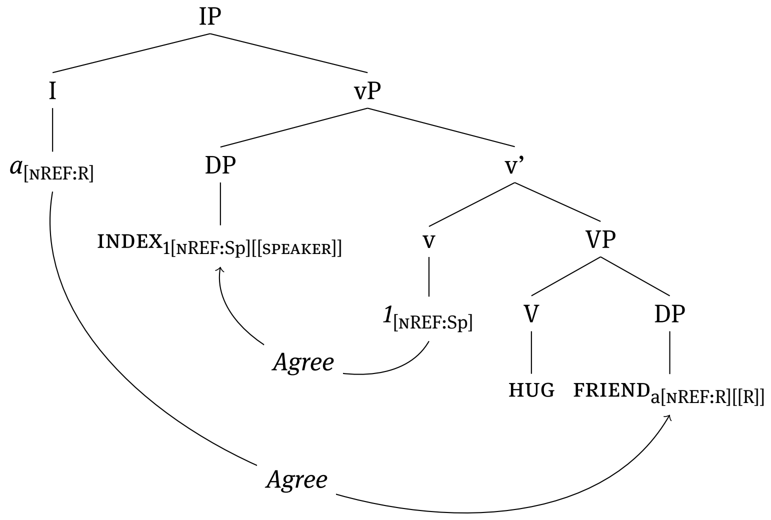
12 The reason the matter is addressed separately is because the discussion is somewhat more speculative in nature. The corpus data show clear patterns, but also variation, with respect to constituent order in constructions with agreement verbs, as well as other verb types. However, they cannot tell us which factors may affect constituent order, such that I can only make informed guesses about underlying syntactic structure and movement operations.

11.2.1 Backward verbs

So far, I have modeled the agreement process for regular agreement verbs, but backward verbs need a different treatment. It appears that my account is compatible with the analysis of backward verbs proposed by Pfau, Salzmann & Steinbach (2018), also for DGS. Building on Müller (2009), who proposes a formal analysis of ergative constructions in spoken languages, Pfau, Salzmann & Steinbach (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.[13] 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 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, Salzmann & Steinbach (2018), but slightly tweaked to conform to the featural system I proposed in Section 11.1.3, is represented in (17).

(17) 'I hugged my friend.'



13 Agree between v and the subject is assumed to be subject to m-command; for further technical details, see Müller (2009) and Pfau, Salzmann & Steinbach (2018).

11.2.2 From body-anchored to agreement verbs

As pointed out various times in previous chapters, some body-anchored verbs may develop into agreement verbs, often via an intermediate step in which the body-anchored verb starts to display object agreement (e.g. Engberg-Pedersen 1993; Meir et al. 2007; Meir 2012). Several such 'hybrid' forms were 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 agreement verbs, in line with our expectations. While it may still not be concluded that these hybrids were originally body-anchored verb forms, Pfau, Salzmann & Steinbach (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 agreement verb. With this in mind, let us consider which formal changes must occur for a body-anchored verb to develop into an agreement 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-achored 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.[14]

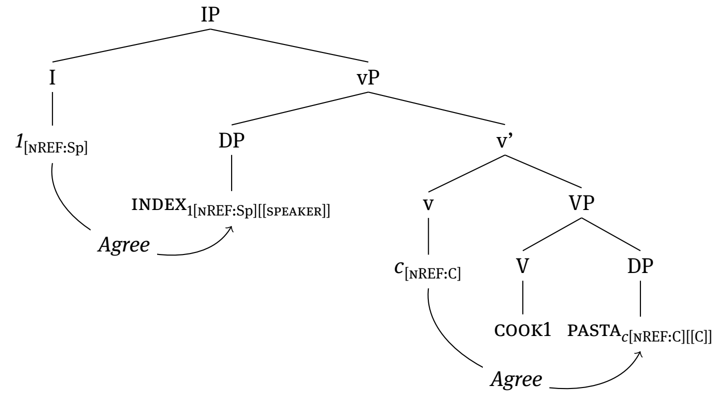
The next step is for the verb to, as Meir et al. (2007) put it, 'detach' from the body. In formal terms, this means that the inherent first-person feature on the verb becomes a non-inherent feature which may take any value. The result is a double-agreement verb form. There may be general pressures to 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.

14 This also means that the restriction on non-first person subject drop still applies with these hybrid verbs.

11.3 Accounting for neutral verbs

In Chapter 7.4, 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.[15] As such, the structure of transitive constructions with neutral verbs is identical to that of constructions with agreement 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 also the feature that gets spelled out first.[16]

There is one difference between the representation in (18) and the representation of regular agreement 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 inan-

15 It 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 obligatory. The issue of optionality is addressed in Section 11.4.4.

16 This proposal is accordant with an account offered for Brazilian Sign Language 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”.

imate arguments, which frequently occur with neutral verbs, tend to be localized at the center of the signing space (see Chapter 7.4). 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.[17]

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 & 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

17 See Chapter 7.4 for arguments that the center of the signing space should be considered as a legitimate locus available for agreement purposes. In Section 11.4.5, I show that impersonal subjects may also be associated with the center of the signing space.

from example (27) in Chapter 7.4.1. In this biclausal construction, SPAGHETTI and TOMATO are localized at contrasting loci on the left and right.

(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.

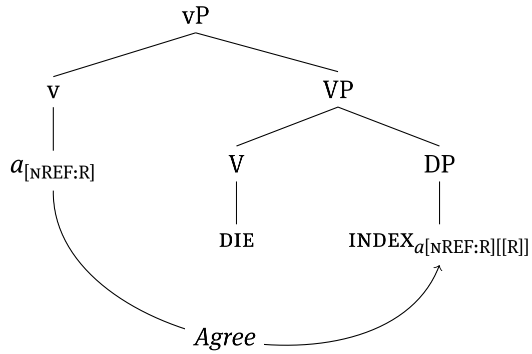
(20) a. **Animate:**
… R … L … RR …
b. **Inanimate:**
Standard: … C …
Contrast: … R … L … RR …

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; Dixon 1994; Dahl 2011; Silverstein 1976). Indeed, such observations have motivated the development of animacy hierarchies (e.g. Silverstein 1976; Croft 2003).[18]

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.

18 Interestingly 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 11.4.5 for (some) further discussion.

(21) 'He died.'



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.[19] 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.

11.4 Outstanding issues

Several issues have not yet been addressed in the analysis laid out in the sections 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 9.1, I showed that body-anchored, neutral, and agreement 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

19 However, it is worth reiterating from Chapter 7.4 that some neutral verb forms appear to have some limited ability to localize on the signer's body.

neglected in the formal analysis, in which I primarily focused on the workings of the agreement mechanism. In Section 11.4.1, 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 1.1.4) may interact with verbs of the different types. The reason for that is simple: there were only a handful of constructions in the corpus data which contained 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 11.4.2 how constructions with PAM can be integrated into the general account.

Third, I pointed out in Section 11.1.6 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 11.4.3.

Fourth, in the formal analysis for neutral verbs in Section 11.3, 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 11.4.4.

Finally, in Section 11.4.5, I devote some space to discussing impersonal constructions. The DGS corpus data contained 281 impersonal constructions, but these were excluded from the analyses in previous chapters as they warrant independent investigation, which fell outside the scope of this research. 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.

11.4.1 Movement and constituent order

The structural representations for clauses with body-anchored, agreement, and neutral verbs presented in this chapter do not necessarily derive the most common surface constituent orders for each verb type. As described in Section 9.1, 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), agreement 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).

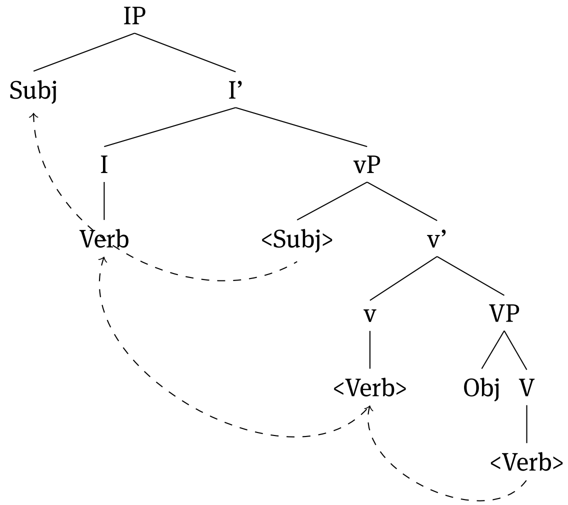
Since I have not thoroughly investigated the factors that may affect constituent order beyond verb type, it is not possible at present to make any strong claims about both the underlying order of DGS clauses and the movement operations that take place, and under what conditions, to yield particular surface 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 & Sutton-Spence (2014) observe on the basis of previous literature (see e.g. Sze 2003; Kegl 2004a,b; Vermeerbergen et al. 2007; Milković, Bradarić-Jončić & Wilbur 2006) 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 agreement 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 analyis 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 agreement 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 & Hole 2017; Pfau & Glück 2000; Steinbach & Herrmann 2013; Pfau, Salzmann & Steinbach 2018; Bross 2018), 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.

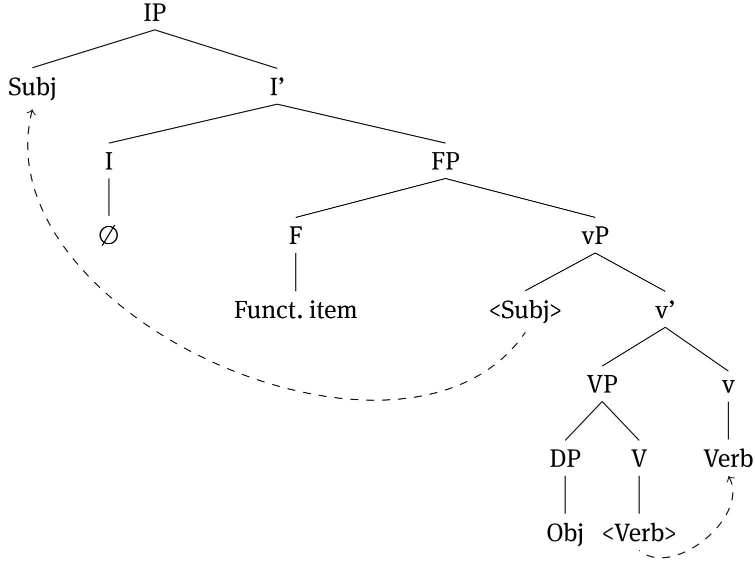
(22) Basic clausal structure in DGS; the verb moves for agreement purposes, deriving SVO order from an underlying SOV order.



However, the structure in (22), yielding SVO order, cannot account for the presumably derived SOV order that is preferred in clauses with agreement 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 agreement 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 agreement 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 agreement 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 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.

11.4.2 Person agreement marker

In the formal analysis presented in this chapter, I did not take clauses with the agreement auxiliary PAM (see Chapter 1.1.4) into account. The reason for that is simple: just ten examples in the corpus data included 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-occurred with a body-anchored verb, in two cases it combined with a spatial verb, and in a further two examples, it occurred in a clause with an agreement 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. $\overline{\text{INDEX}_1\ \textbf{SEE}\ \text{WHEN}}^{\text{ht, re}}$ $\textbf{SEE}_a\ {}_1\text{PAM}_a$
‘At what other time would I be able to see these people?’
[koe19a-A-06:19.90]

b. $\overline{\text{POSS}_1\ \text{MOTHER PAM}_1\ {}_1\textbf{THROW}_{a*}}^{\text{re}}$ \ $\overline{\text{NO}}^{\text{hs}}$
‘My mother wouldn’t have sent me anywhere else.’ [fra05-A-13:37.95]

c. dh: INDEX$_a$ **KNOW1** GOOD
ndh: INDEX$_a$ .... $_a$PAM$_b$
'They know her well.' [stu03-02:28.35]

In five clauses, the auxiliary preceded the verb, but it followed 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 followed the verb in 239 (68.9%) cases, while the remaining 108 (31.1%) clauses displayed 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.

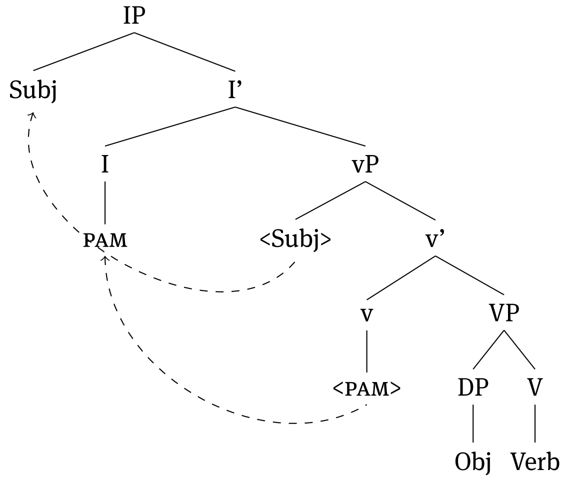
Since I lack the data to make any strong claims about the factors interacting with constituent order in clauses with PAM, I will not be concerned with this issue further, and I will simply assume an order in which PAM precedes the object and the verb. Rather, I wish to demonstrate how the agreement process works in such constructions.

In line with Pfau, Salzmann & Steinbach (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.

As noted by Pfau, Salzmann & Steinbach (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 involved a combination of a hybrid verb marking its object plus PAM (24a), and another includes an agreement verb expressing agreement with both arguments.[20] Assuming, then, that double marking is possible – even though it might not occur very often – we may simply follow Pfau, Salzmann & Steinbach (2018) in suggesting that constructions with double marking are actually biclausal, with PAM taking an IP-complement.

20 Macht (2016) does not discuss the issue, and none of the corpus examples she provides appear to show double marking.

(25) ‘I know him.’



11.4.3 Object drop in body-anchored verb constructions

In Section 11.1.6, 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, null objects are evidently allowed.

We may turn to the spoken language literature for a potential explanation, as 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. Farrell 1990; Cummins & Roberge 2004; Cardinaletti 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.

11.4.4 Optionality of the localization of neutral verbs

Analysis of the corpus data showed that agreement is almost always marked on agreement verbs, but less often so with neutral verbs (see Chapter 9.3). 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 agreement 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; Padden 1988; Fenlon, Schembri & Cormier 2018), as it is one of the non-canonical aspects of agreement marking in sign languages. Although the corpus data provide evidence that agreement 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 agreement 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 (24) in Chapter 7.4.1. 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.[21] 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
S V \ # S V
'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 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 agreement verbs, on the other hand, there are usually two animate 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, Salzmann & Steinbach (2018) and propose an impoverishment rule à la Bonet (1991) or Halle & 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.

21 I 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.

11.4.5 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, thus calling for a separate treatment (see Chapter 1.1.6). 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 & 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 1.1.6 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).[22] The impersonal pronoun and the neutral verb in (27b) are illustrated in Figure 11.1. 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. $_a$**TAKE2** CAN PU
‘You can cherry-pick [actors].’ [mst01-A-05:23.55]

b. INDEX$_1$ EXPERIENCE \ ALREADY INDEX$_{up}$ **BUILD1**++ CL():TOWER++
‘I heard that they are already building new towers.’
[fra01b-A-04:58.75]

22 Hansen (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.

c. MUCH INDEX$_{up}$ **TEACH**$_1$
‘They had to teach me a lot.’ [fra05-B-03:51.70]

(a) INDEX$_{up}$ **(b)** BUILD

Fig. 11.1: (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 11.2a and 11.2b, respectively. Another 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**$_a$
‘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]

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 11.2b, the signer uses the citation form of the verb SEND2 in this example, which involves a short path movement from a location somewhat

(a) GIVE$_a$ **(b)** SEND2

Fig. 11.2: Articulation of the verbs GIVE from (28a) and SEND2 from (28b) at a default place of articulation.

closer to the signer to a location somewhat further away from it.[23] 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 morphological passives (see Chapter 1.1.6). 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 that inanimate arguments are usually associated with (see Section 11.3). As suggested above, factors such as referentiality and specificity appear to play a role here, where arguments with a lower degree of refentiality 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 book, but it seems to me to be a fruitful area for future research.

23 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).

11.5 Conclusions

In this chapter, I presented a unified formal analysis of constructions with body-anchored, agreement, and neutral verbs, arguing that all three verb types can be accounted for within the same framework using the same general syntactic mechanisms. Subject-drop patterns, as described for each verb type in the chapters in Part III of this book, provided the starting point for the analysis. Specifically, I argued that all three verb types license null subjects 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 & 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.[24]

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),

24 First-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.

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 & 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 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.

This formal analysis thus 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 grammatical analysis itself, it serves as a background for motivating specific grammatical properties of verbal signs.

The general mechanics of the agreement system were subsequently applied in the analyses of constructions with agreement and neutral verbs. As for the former, agreement 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 agreement verbs also overtly agree with their object, referent features are present in the v-head, too.

Regarding neutral verbs, I argued that transitive neutral verb constructions are structurally identical to agreement 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.

Thus, I proposed a unified analysis of body-anchored, agreement, 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 agreement 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.

12 Concluding remarks

This book 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 (agreement 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 12.1. I reflect on the potential methodological shortcomings of the research presented in this book in Section 12.2. In Section 12.3, I provide directions for future research into verbs and verb classification in sign languages.

12.1 Outcomes

In this section, I discuss the main findings of the research presented in this book by taking an increasingly broader perspective. In Section 12.1.1, I describe how the results contribute to the linguistic description of DGS, the language this research has focused on. Many of the key issues that have been addressed in this book with respect to verb classification are equally relevant to other sign languages; I therefore explore in Section 12.1.2 what we may learn from the DGS-specific results about the structure of sign languages in general. In Section 12.1.3, I consider what the results may tell us about human language in general. In particular, I expound on which properties of verbs appear to be modality-specific and which seem modality-independent.

https://doi.org/10.1515/9783110742787-012

12.1.1 German Sign Language

This book 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, Haspelmath & Taylor 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 agreement verbs. This division diverges from Padden's (1988) classic tripartite verb classification based on American Sign Language (ASL) data, in which body-anchored and neutral verbs are subsumed under the single category of plain verbs, but an additional distinction is made between agreement verbs that agree with person (regular agreement verbs) and agreement verbs that agree with location (spatial verbs). In the annotation of the corpus data, I maintained a lower-level distinction between spatial and regular agreement verbs in order to allow systematic comparison to establish whether collapsing them into a single category is justified.

Indeed, scrutiny of the DGS Corpus data provided morphosyntactic evidence that a distinction between regular agreement verbs and spatial verbs is warranted in DGS. In particular, I showed that the data provided evidence that the modification properties of agreement verbs are controlled by referential loci, while there are much looser restrictions on the modification properties of spatial verbs. In other words, agreement marking with regular agreement 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, Salzmann & Steinbach 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 agreement verbs in terms of agreement, based on an analysis of the morphosyntactic properties of these verb types in DGS.[1]

1 I should note, however, that neutral verbs were shown to allow for a somewhat higher degree of optionality in agreement marking (see Chapter 11.4.4 for discussion).

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 agreement 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 is consistently 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 agreement 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.

Specifically, I showed that body-anchored verbs in DGS tend to denote events of experience, neutral verbs often express either prototypically transitive or prototypically intransitive (unaccusative) events, while agreement verbs often involve an interaction between event participants. 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 agreement verb forms, although I also attested a couple of verb forms that appear to be hybrids of neutral and agreement 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 was that the restrictions on locus alignment and subject drop appeared considerably looser than with agreement verbs. This led me to conclude that spatial verbs do not participate in Agree in DGS – even in case a form happens to align with a referent locus. Instead, I proposed in Chapter 10 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 received 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 reported 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 research for the study of sign languages as a whole.

2 I should note that Keller (1998) focuses predominantly on locus assignment and verb agreement, and less so on other properties.

12.1.2 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 12.1.3 for further discussion), it seems that in sign languages, iconicity is 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 is allows one to formulate 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 agreement 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 agreement verb form which denotes, say, a perception event in such a language. Conversely, in a sign language with relatively many agreement 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 12.1.3 for further discussion.

Related to the topic of verb semantics, with the use of iconic mappings (Taub 2000, 2001), I showed in Chapter 4 that verbs of all types use similar kinds of iconically motivated handshapes in DGS (although there are differences in preference). The iconic mappings and the semantic map analyses combined led me the the conclusion in Chapter 5 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. Moreover, in Oomen & Kimmelman (2019), we report on subject-drop patterns in Russian Sign Language (RSL) in addition to the results on DGS discussed in this book. 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 (constructions with agreement verbs are not investigated in Oomen & Kimmelman 2019), 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. Of course, every 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 agreement 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 agreement 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 agreement 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 Quadros & Quer (2008). A key observation leading to my conclusion is that agreement 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. Fenlon, Schembri & Cormier 2018; de Beuzeville, Johnston & Schembri 2009; Legeland 2016). Although it is a possibility that the difference in results may partially be explained by methodological differences (see Section 12.2 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 agreement marking system in sign languages (contra e.g. Schembri, Cormier & Fenlon 2018, but in line with e.g. Pfau, Salzmann & Steinbach 2018), a high degree of optionality would make the distinction between agreement and spatial verbs less pronounced.

Spatial verbs have generally not been studied as thoroughly as agreement verbs – although Padden (1990) makes a number of observations for ASL which I also described for DGS – such that it is not quite clear in how far spatial verbs in other sign languages display similar characteristics 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 (also see Chapter 10.3).

12.1.3 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 book 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 & Thompson (1980), for instance, already argued for several decades 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 in Part III 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 & Rappaport Hovav (1991, 1995) and Levin (1993).

I also showed that, upon closer inspection, some properties of the verb-type system in sign languages that have typically been regarded as non-canonical 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

3 For a comprehensive work providing ample examples in support of this point, see Sandler & Lillo-Martin (2006).

4 I hasten to add that the strength of correlation between signed and spoken languages warrants further investigation; see Section 12.3.

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 11.1.2, 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 & Ritter 2002).

On the whole, I believe that the research in this book 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.

12.2 Methodology – a reflection

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 agreement verbs is the norm rather than the exception in DGS. This is

5 I 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.

a striking result, as agreement marking has been assumed by many, and for many different sign languages, to be optional (indeed, e.g. Pfau, Salzmann & Steinbach 2018 make the same assumption in their analysis of verb agreement in DGS).

Previous corpus-based studies on Australian Sign Language (de Beuzeville, Johnston & Schembri 2009), British Sign Language (BSL; Fenlon, Schembri & Cormier 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, Schembri & Cormier (2018) present the most thorough analysis, I shall focus here on the methodology and definitions they employ in their study of BSL. Importantly, Fenlon, Schembri & Cormier (2018) treat agreement 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, Schembri & Cormier (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, Schembri & Cormier (2018) are somewhat more generous in what they qualify as agreement than I have been.

Yet, when agreement 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, Schembri & Cormier (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, Schembri & Cormier (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

6 Also, recall from Chapter 11.4.5 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.

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, Schembri & Cormier (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 displaced 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 agreement verbs do; see Chapter 11.4.4 for discussion.

Let me conclude the discussion by emphasizing again that the different results in Fenlon, Schembri & Cormier (2018) and in this book 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 11, I presented a formal analysis of constructions with body-anchored, neutral, and agreement verbs. In part, the account relied on frequency patterns in the corpus data that show that some phenomena (i.e. agreement marking with agreement 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, Haspelmath & Taylor 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 disproportionally 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 Chapter 4.

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 book. 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 agreement 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 book 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 Chapters 6.2, 7.2, and 8.2 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 11, separately offering a number of suggestions which are more speculative in nature in Chapter 11.4.1. 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).

12.3 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 agreement verbs. Indeed, Meir et al. (2007) report that Al-Sayyid Bedouin Sign Language (ABSL) does not include any agreement 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 book 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 Macht & Steinbach 2019; Hillenmeyer & Tilmann 2012), 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 hand, grammatical properties for which I argued iconicity plays a role, such as the restriction on

7 Interestingly, Meir et al. (2007) report that ABSL does have spatial verbs, depicting a trajectory of motion; also see Kwok, Berk & Lillo-Martin (2020).

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 11.1.5 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 8, I showed that regular agreement 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, and I put forward a separate analysis for them in terms of demonstration in Chapter 10. However, since my data set only included six different spatial verb forms, additional investigation 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 Quadros & Quer (2008) for Brazilian Sign Language, 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 another 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 book for DGS. I hope that this work may serve as a useful guide as to what type of properties to look out for.

A Verb meanings and lexical signs

Tab. A.1: Lexical signs for each verb meaning, verb type, and token frequency. In the frequency column on the right, the number enclosed in brackets indicates the number of tokens used as a nominal or adjective, which were excluded from analysis.

#	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 (-)

https://doi.org/10.1515/9783110742787-013

#	Verb meaning	Lexical signs	Verb types	Freq.
15	EAT	EAT1	body-anchored	2 (10)
		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)
		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 (-)

#	Verb meaning	Lexical signs	Verb types	Freq.
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)
		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)

Bibliography

Ackema, Peter & Ad Neeleman. 2013. Subset controllers in agreement relations. *Morphology* 23. 291–323.
Adams, Thomas W. 1998. *Gesture in foreigner talk*. University of Pennsylvania dissertation.
Albreghs, Fritz. 1927. Der Reichsverband der Gehörlosen Deutschlands [The national association of the German deaf]. *Die Stimme*.
Alibašić Ciciliani, Tamara & Ronnie B. Wilbur. 2006. Pronominal system in Croatian Sign Language. *Sign Language & Linguistics* 9(1/2). 95–132.
Aristodemo, Valentina & Carlo Geraci. 2018. Visible degrees in Italian Sign Language. *Natural Language & Linguistic Theory* 36(3). 685–699.
Aronoff, Mark, Irit Meir & Wendy Sandler. 2005. The paradox of sign language morphology. *Language* 81. 301–344.
Aronoff, Mark et al. 2004. Morphological universals and the sign language type. In Geert Booij & Jaap van Marle (eds.), *Yearbook of Morphology*, 19–40. Dordrecht/Boston, MA: Kluwer.
Bahan, Benjamin. 1996. *Non-manual realization of agreement in American Sign Language*. Boston University dissertation.
Bahan, Benjamin et al. 2000. The licensing of null arguments in American Sign Language. *Linguistic Inquiry* 31. 1–27.
Barberà, Gemma. 2012. *The meaning of space in Catalan Sign Language: Reference, specificity and structure in signed discourse*. Universitat Pompeu Fabra dissertation.
Barberà, Gemma & Patricia Cabredo Hofherr. 2017a. Backgrounded agents in Catalan Sign Language (LSC): Passives, middles or impersonals? *Language* 93. 767–798.
Barberà, Gemma & Patricia Cabredo Hofherr. 2017b. Two indefinite pronouns in Catalan Sign Language (LSC). In Robert Truswell et al. (eds.), *Proceedings of Sinn und Bedeutung 21*, 89–105.
Barberà, Gemma & Patricia Cabredo Hofherr. 2018. Impersonal human reference in sign languages: Introduction and questionnaire. *Sign Language & Linguistics* 21(2). 183–203.
Barberà, Gemma & Josep Quer. 2013. Impersonal reference in Catalan Sign Language (LSC). In Laurence Meurant et al. (eds.), *Sign language research, uses and practices: Crossing views on theoretical and applied sign language linguistics*, 237–258. Berlin: De Gruyter.
Bates, Douglas et al. 2015. Fitting linear mixed-effects models using lme4. *Journal of Statistical Software* 67(1). 1–48.
Battison, Robbin. 1978. *Lexical borrowing in American Sign Language*. Silver Spring, MD: Linstok Press.
Belletti, Adriana & Luigi Rizzi. 1988. Psych-verbs and θ-theory. *Natural Language & Linguistic Theory* 6(3). 291–352.
Benedicto, Elena & Diane Brentari. 2004. Where did all the arguments go? Argument-changing properties of classifiers in ASL. *Natural Language & Linguistic Theory* 22. 743–810.
de Beuzeville, Louise A., Trevor Johnston & Adam Schembri. 2009. The use of space with indicating verbs in Auslan: A corpus based investigation. *Sign Language & Linguistics* 12(1). 53–82.
Blanck, Dolly et al. 2010. The DGS Corpus project – Development of a corpus based electronic dictionary German Sign Language - German. Poster presented at *Theoretical Issues in Sign Language Research 10*. West Lafayette, IN. https://www.sign-lang.uni-hamburg.de/dgskorpus/index.php/publications.html.

https://doi.org/10.1515/9783110742787-014

Bonet, Eulalia. 1991. *Morphology after syntax: Pronominal clitics in Romance*. MIT dissertation.
Börstell, Carl, Thomas Hörberg & Robert Östling. 2016. Distribution and duration of signs and parts of speech in Swedish Sign Language. *Sign Language & Linguistics* 19(2). 143–196.
Börstell, Carl, Ryan Lepic & Gal Belsitzman. 2016. Articulatory plurality is a property of lexical plurals in sign language. *Linguisticæ Investigationes* 39(2). 391–407.
Bos, Heleen F. 1993. Agreement and prodrop in Sign Language of the Netherlands. *Linguistics in Amsterdam* 10(1). 37–47.
Bos, Heleen F. 1995. Pronoun copy in Sign Language of the Netherlands. In Heleen F. Bos & Trude Schermer (eds.), *Sign language research 1994. Proceedings of the Fourth European Congress on Sign Language Research*, 201–216. Hamburg: Signum.
Bos, Heleen F. 2017. An analysis of main verb agreement and auxiliary agreement in NGT within the theory of Conceptual Semantics (Jackendoff 1990). *Sign Language & Linguistics* 20(2). (Original unpublished work 1998), 228–252.
Bosworth, Rain G. & Karen Emmorey. 2010. Effects of iconicity and semantic relatedness on lexical access in American Sign Language. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 36(6). 1573–1581.
Boye, Kasper. 2010. Semantic maps and the identification of cross linguistic generic categories: Evidentiality and its relation to epistemic modality. *Linguistic Discovery* 8(1). 4–22.
Boyes Braem, Penny & Rachel Sutton-Spence (eds.). 2001. *The hands are the head of the mouth: The mouth as an articulator in sign languages*. Hamburg: Signum.
Brentari, Diane. 1998. *A prosodic model of sign language phonology*. Cambridge, MA: MIT Press.
Brentari, Diane & John Goldsmith. 1993. Secondary licensing and the non-dominant hand in ASL phonology. In George R. Coulter (ed.), *Current Issues in ASL Phonology*, 19–41. New York, NY: Academic Press.
Bross, Fabian. 2018. *The clausal syntax of German Sign Language*. Universität Stuttgart dissertation.
Bross, Fabian & Daniel Hole. 2017. Scope-taking strategies and the order of clausal categories in German Sign Language. *Glossa: A Journal of General Linguistics* 2(1). 76. https://doi.org/10.5334/gjgl.106.
Cardinaletti, Anna. 1990. Subject/object asymmetries in German null-topic constructions and the status of SpecCP. In Joan Mascaró & Marina Nespor (eds.), *Grammar in progress*, 75–84. Dordrecht: Foris.
Chen-Pichler, Deborah C. 2008. Views on word order in early ASL: Then and now. In Josep Quer (ed.), *Signs of the time: Selected papers from TISLR 2004*, 293–318.
Childs, G. Tucker. 1994. African ideophones. In Leanne Hinton, Johanna Nichols & John J. Ohala (eds.), *Sound symbolism*, 178–206. Cambridge: Cambridge University Press.
Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*, 1–52. Cambridge, MA: MIT Press.
Comrie, Bernard. 1973. The ergative: Variations on a theme. *Lingua* 32. 239–253.
Corbett, Greville G. 1979. The agreement hierarchy. *Journal of Linguistics* 15. 203–224.
Corbett, Greville G. 2003. Agreement: Canonical instances and the extent of the phenomenon. In Geert Booij et al. (eds.), *Topics in Morphology: selected Papers from the Third Mediterranean Morphology Meeting*, 109–128.
Corbett, Greville G. 2006. *Agreement*. Cambridge: Cambridge University Press.
Cormier, Kearsy. 2012. Pronouns. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 227–244. Berlin: De Gruyter Mouton.

Cormier, Kearsy, Jordan Fenlon & Adam Schembri. 2015. Indicating verbs in British Sign Language favour motivated use of space. *Open Linguistics* 1. 684–707.

Cormier, Kearsy, Stephen Wechsler & Richard Meier. 1998. Locus agreement in American Sign Language. In Gert Webelhuth, Jean-Piere Koenig & Andreas Kathol (eds.), *Lexical and constructional aspects of linguistic explanation*, 215–229. Stanford, CA: Center for the Study of Language & Information.

Costello, Brendan. 2015. *Language and modality. Effects of the use of space in the agreement system of lengua de signos española (Spanish Sign Language).* University of Amsterdam dissertation.

Crasborn, Onno & Els van der Kooij. 1997. Relative orientation in sign language phonology. *Linguistics in the Netherlands* 14. 37–48.

Crasborn, Onno, Els van der Kooij & Johan Ros. 2012. On the weight of phrase-final prosodic words in a sign language. *Sign Language & Linguistics* 15(1). 11–38.

Crasborn, Onno, Inge Zwitserlood & Johan Ros. 2008. *Het Corpus NGT. Een digitaal open access corpus van filmpjes en annotaties van de Nederlandse Gebarentaal.* http://corpusngt.nl/.

Crasborn, Onno et al. 2009. Topic agreement in NGT (Sign Language of the Netherlands). *Linguistic Review* 26(2/3). 355–370.

Croft, William. 2003. *Typology and universals*. 2nd edn. Cambridge: Cambridge University Press.

Cummins, Sarah & Yves Roberge. 2004. Null objects in French and English. In Julie Auger, J. Clancy Clements & Barbara Vance (eds.), *Current issues in linguistic theory: contemporary approaches to Romance linguistics*, 121–138. Amsterdam: John Benjamins.

Dachkovsky, Svetlana. 2008. Facial expression as intonation in Israeli Sign Language: The case of neutral and counterfactual conditionals. In Josep Quer (ed.), *Signs of the time: Selected papers from TISLR 2004*, 61–82. Hamburg: Signum.

Dachkovsky, Svetlana & Wendy Sandler. 2009. Visual intonation in the prosody of a sign language. *Language and Speech* 52(2/3). 287–314.

Dahl, Östen. 2011. Animacy and the notion of semantic gender. In Barbara Unterbeck et al. (eds.), *Gender in grammar and cognition: Vol. 1. Approaches to gender*, 99–116. Berlin: De Gruyter Mouton.

Davidson, Kathryn. 2015. Quotation, demonstration, and iconicity. *Linguistics & Philosophy* 38. 477–520.

Dik, Simon. 1989. *The theory of Functional Grammar: Vol. 1. The structure of the clause*. Dordrecht: Foris.

Dingemanse, Mark et al. 2015. Arbitrariness, iconicity, and systematicity in language. *Trends in Cognitive Sciences* 19(1). 603–615.

Dixon, Robert M. W. 1979. Ergativity. *Language* 55. 59–138.

Dixon, Robert M. W. 1994. *Ergativity*. Cambridge: Cambridge University Press.

Dryer, Matthew S. 2013. Order of subject, object and verb. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. https://wals.info/chapter/81.

Eichmann, Hanna & Rachel Rosenstock. 2014. Regional variation in German Sign Language: The role of schools (re-)visited. *Sign Language Studies* 14(2). 175–202.

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

Engberg-Pedersen, Elisabeth. 1993. *Space in Danish Sign Language.* Hamburg: Signum.

Eriksen, Pål K., Seppo Kittilä & Leena Kolehmainen. 2012. Weather and language. *Language and Linguistic Compass* 6(6). 383–402.

Farrell, Patrick. 1990. Null objects in Brazilian Portuguese. *Natural Language & Linguistic Theory* 8. 325–346.
Fenlon, Jordan. 2010. *Seeing sentence boundaries: The production and perception of visual markers signalling boundaries in signed languages*. University College London dissertation.
Fenlon, Jordan, Adam Schembri & Kearsy Cormier. 2018. Modification of indicating verbs in British Sign Language: A corpus-based study. *Language* 94(1). 84–118.
Ferguson, Charles A. 1971. Absence of copula and the notion of simplicity. In Dell Hymes (ed.), *Pidginization and creolization of language*, 141–150. Cambridge: Cambridge University Press.
Ferguson, Charles A. 1981. 'Foreigner talk' as the name of a simplified register. *International Journal of the Sociology of Language* 28. 9–18.
Ferrara, Lindsay. 2012. *The grammar of depiction: Exploring gesture and language in Australian Sign Language (Auslan)*. Macquarie University dissertation.
Fillmore, Charles J. 1968. The case for case. In Emmon Bach & Robert T. Harms (eds.), *Universals in linguistic theory*, 1–88. New York: Holt, Rinehart & Winston.
Fischer, Susan D. 1975. Influences on word order change in American Sign Language. In Charles Li (ed.), *Word order and word order change*, 1–25. Austin, TX: University of Texas Press.
Fischer, Susan D. 1978. Sign languages and creoles. In Patricia Siple (ed.), *Understanding language through sign language research*, 309–331. New York, NY: Academic Press.
Fischer, Susan D. 2014. Constituent order in sign languages. *Gengo Kenkyu (Journal of the Linguistic Society of Japan)* 146. 1–12.
Fischer, Susan D. & Bonnie Gough. 1978. Verbs in American Sign Language. *Sign Language Studies* 18. 17–48.
Friedman, Lynn A. 1975. Space, time, and person reference in American Sign Language. *Language* 51(14). 940–961.
Gee, James P. & Wendy Goodhart. 1988. American Sign Language and the human biological capacity for language. In Michael Strong (ed.), *Language learning and deafness*, 49–74. Cambridge: Cambridge University Press.
Geraci, Carlo & Valentina Aristodemo. 2016. An in-depth tour into sentential complementation in Italian Sign Language. In Roland Pfau, Markus Steinbach & Annika Herrmann (eds.), *A matter of complexity: subordination in sign languages*, 95–150. Berlin: De Gruyter Mouton.
Geraci, Carlo et al. 2015. Variation in Italian Sign Language (LIS): The case of wh-signs. *Linguistics* 53(1). 125–151.
van Gijn, Ingeborg & Inge Zwitserlood. 2006. Agreement phenomena in Sign Language of the Netherlands. In Peter Ackema et al. (eds.), *Arguments and agreement*, 195–229. Oxford: Oxford University Press.
Givón, Thomas. 1979. *On understanding grammar*. New York, NY: Academic Press.
Glück, Susanne & Roland Pfau. 1998. On classifying classification as a class of inflection in German Sign Language. In Tina Cambier-Langeveld, Anikó Lipták & Michael Redford (eds.), *ConSOLE VI Proceedings*, 59–74. Leiden: SOLE.
Grice, Herbert Paul. 1975. Logic and conversation. In Peter Cole & Jerry L. Morgan (eds.), *Syntax and semantics: Vol. 3. Speech acts*, 41–58. New York, NY: Academic Press.
Gries, Stefan Th. 2009. What is corpus linguistics? *Language and Linguistics Compass* 3(5). 1225–1241.
Grimshaw, Jane. 1990. *Argument structure*. Cambridge, MA: MIT Press.
Grose, Donovan, Ronnie B. Wilbur & Katharina Schalber. 2007. Events and telicity in classifier predicates: A reanalysis of body part classifier predicates in ASL. *Lingua* 117(7). 1258–1284.

Günther, Klaus-B. et al. 2004. Vergleichende Untersuchungen zur Entwicklung der Textproduktionskompetenz und Erzählkompetenz [Comparative studies on the development of text production competence and narrative competence]. In Klaus-B. Günther & Ilka Schäfke (eds.), *Bilinguale Erziehung als Förderkonzept für gehörlose Schülerinnen: Abschlußbericht zum Hamburger bilingualen Schülversuch*, 189–267. Hamburg: Signum.

Haiman, John. 1980. The iconicity of grammar: Isomorphism and motivation. *Language* 56. 515–540.

Haiman, John (ed.). 1985. *Iconicity in syntax*. Amsterdam: John Benjamins.

Halle, Morris & Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In Kenneth Hale & Samuel J. Keyser (eds.), *The view from building 20*, 111–176. Cambridge, MA: MIT Press.

Hanke, Thomas. 2002. iLex - A tool for sign language lexicography and corpus analysis. In *Proceedings of the Third International Conference on Language Resources and Evaluation*, 923–926. http://www.lrec-conf.org/proceedings/lrec2002/.

Hanke, Thomas. 2004. HamNoSys – Representing sign language data in language resources and language processing contexts. In O. Streiter & C. Vittori (eds.), *Proceedings of the 2nd Workshop on the Representation and Processing of Signed Languages: From SignWriting to Image Processing*, 1–6. Paris: ELRA.

Hanke, Thomas & Jakob Storz. 2008. iLex - A database tool for integrating sign language corpus linguistics and sign language lexicography. In Onno Crasborn et al. (eds.), *Proceedings of the 3rd Workshop on the Representation and Processing of Signed Languages: Construction and Exploitation of Sign Language Corpora*, 64–67. Paris: ELRA.

Hansen, Martje. 2007. *Warum braucht die Deutsche Gebärdensprache kein Passiv? Verfahren der Markierung semantischer Rollen in der DGS. [Why does German Sign Language not need a passive? Marking strategies of semantic roles in DGS]*. Frankfurt am Main: Peter Lang.

Hansen, Martje & Jens Heßmann. 2007. Matching propositional content and formal markers: Sentence boundaries in a DGS text. *Sign Language & Linguistics* 10(2). 145–175.

Happ, Daniela & Marc-Oliver Vorköper. 2006. *Deutsche Gebärdensprache: Ein Lehr- und Arbeitsbuch [German Sign Language: A study- and workbook]*. Frankfurt am Main: Fachhochschulverlag.

Harley, Heidi & Elizabeth Ritter. 2002. Person and number in pronouns: A feature-geometric analysis. *Language* 78(3). 482–526.

Hartmann, Iren, Martin Haspelmath & Bradley Taylor (eds.). 2013. *Valency Patterns Leipzig*. Max Planck Institute for Evolutionary Anthropology. http://valpal.info/.

Haspelmath, Martin. 1999. External possession in a European areal perspective. In Doris Payne & Immanuel Barshi (eds.), *External possession*, 109–135. Amsterdam: John Benjamins.

Haspelmath, Martin. 2003. The geometry of grammatical meaning: Semantic maps and cross-linguistic comparison. In Michael Tomasello (ed.), *The new psychology of language: Vol. 2. Cognitive and functional approaches to language structure*, 211–243. New York, NY: Lawrence Erlbaum.

Hatch, Evelyn, R. Shapira & Jessica Gough. 1978. "Foreigner-talk" discourse. *International Journal of Applied Linguistics* 39(1). 39–60.

Healy, Christina. 2015. *Construing affective events in ASL*. Gallaudet University dissertation.

Hengeveld, Kees & Eva van Lier. 2010. An implicational map of parts of speech. *Linguistic Discovery* 8(1). 129–156.

Herrmann, Annika. 2013. *Modal and focus particles in sign languages: A cross-linguistic study*. Berlin: De Gruyter Mouton.

Herrmann, Annika & Markus Steinbach. 2012. Quotation in sign languages: A visible context shift. In Isabelle Buchstaller & Ingrid van Alphen (eds.), *Quotatives: Cross-linguistic and cross-disciplinary perspectives*, 203–230. Amsterdam: John Benjamins.

Hillenmeyer, Margit & Savina Tilmann. 2012. Variation in der DGS [Variation in DGS]. In Hanna Eichmann, Martje Hansen & Jens Heßmann (eds.), *Handbuch Deutsche Gebärdensprache*, 245–270. Seedorf: Signum.

Hockett, Charles Francis. 1959. Animal "languages" and human language. *Human Biology* 31(1). 32–39.

Hockett, Charles Francis. 1960. The origin of speech. *Scientific American* 203. 89–96.

Holmberg, Anders. 1986. *Word order and syntactic features in the Scandinavian languages and English*. Stockholm University dissertation.

Holmberg, Anders. 1999. Remarks on Holmberg's generalization. *Studia Linguistica* 53(1). 1–39.

Holmberg, Anders. 2005. Is there a little pro? Evidence from Finnish. *Linguistic Inquiry* 36(4). 533–564.

Holmberg, Anders, Aarti Nayudu & Michelle Sheehan. 2009. Three partial null-subject languages: A comparison of Brazilian Portuguese, Finnish and Marathi. *Studia Linguistica* 61(1). 59–97.

Hopper, Paul J. & Sandra A. Thompson. 1980. Transitivity in grammar and discourse. *Language* 56(2). 251–299.

Hosemann, Jana. 2011. Eye gaze and verb agreement in German Sign Language: A first glance. *Sign Language & Linguistics* 14(1). 76–93.

Hosemann, Jana. 2021. Verb agreement: experimental perspectives. In Josep Quer, Roland Pfau & Annika Herrmann (eds.), *The Routledge Handbook of Theoretical and Experimental Sign Language Research*, 122–138. Abingdon, Oxon; New York, NY: Routledge.

Hou, Lynn & Richard P. Meier. 2018. The morphology of first-person object forms of directional verbs in ASL. *Glossa: A Journal of General Linguistics* 3(1). 114. https://doi.org/10.5334/gjgl.469.

Huang, James. 1984. On the distribution and reference of empty categories. *Linguistic Inquiry* 15. 531–575.

van der Hulst, Harry. 1996. On the other hand. *Lingua* 98. 121–143.

Hwang, So-One et al. 2017. Of the body and the hands: Patterned iconicity for semantic categories. *Language and Cognition* 9. 573–602.

Janis, Wynne D. 1992. *Morphosyntax of the ASL verb phrase*. State University of New York at Buffalo dissertation.

Janis, Wynne D. 1995. A crosslinguistic perspective on ASL verb agreement. In Karen Emmorey & Judy Reilly (eds.), *Language, gesture, and space*, 195–223. Mahwah, NJ: Lawrence Erlbaum.

Janzen, Terry, Barbara O'Dea & Barbara Shaffer. 2001. The construal of events: Passives in American Sign Language. *Sign Language Studies* 1(3). 281–310.

Johnston, Trevor. 1989. *Auslan: the sign language of the Australian deaf community*. The University of Sydney dissertation.

Johnston, Trevor. 2001. Nouns and verbs in Australian Sign Language: an open or shut case? *Journal of Deaf Studies and Deaf Education* 6(4). 235–257.

Johnston, Trevor & Adam Schembri. 2007. *Australian Sign Language: An introduction to sign language linguistics*. Cambridge: Cambridge University Press.

Kayne, Richard S. 1975. *French syntax: The transformational cycle*. Cambridge, MA: MIT Press.

Kegl, Judy. 1990. Predicate argument structure and verb-class organization in the ASL lexicon. In Ceil Lucas (ed.), *Sign language research: Theoretical issues*, 149–175. Washington, DC: Gallaudet University Press.

Kegl, Judy. 2004a. ASL syntax. Research in progress and proposed research. *Sign Language & Linguistics* 7(2). 173–206.

Kegl, Judy. 2004b. Relational grammar and American Sign Language. *Sign Language & Linguistics* 7(2). 131–170.

Kelepir, Meltem, Aslı Özkul & Elvan Tamyürek Özparlak. 2018. Agent-backgrounding in Turkish Sign Language (TİD). *Sign Language & Linguistics* 21(2). 257–283.

Keller, Jörg. 1998. *Aspekte der Raumnutzung in der Deutschen Gebärdensprache [Aspects of the use of space in German Sign Language]*. Hamburg: Signum.

Kemmer, Suzanne. 1993. *The middle voice*. Amsterdam: John Benjamins.

Kilgarriff, Adam & Gregory Grefenstette. 2003. Introduction to the special issue on the web as corpus. *Computational Linguistics* 29(3). 333–347.

Kimmelman, Vadim. 2009. Parts of speech in Russian Sign Language. The role of iconicity and economy. *Sign Language & Linguistics* 12(2). 161–186.

Kimmelman, Vadim. 2012. Word order in Russian Sign Language: An extended report. *Linguistics in Amsterdam* 5(1). 1–51.

Kimmelman, Vadim. 2018a. Basic argument structure in Russian Sign Language (RSL). *Glossa: A Journal of General Linguistics* 3(1). 116. https://doi.org/10.5334/gjgl.494.

Kimmelman, Vadim. 2018b. Impersonal reference in Russian Sign Language (RSL). *Sign Language & Linguistics* 21(2). 204–231.

Kimmelman, Vadim, Ulrika Klomp & Marloes Oomen. 2018. Where methods meet: Combining corpus data and elicitation in sign language research. In M. Bono et al. (eds.), *Proceedings of the 8th Workshop on the Representation and Processing of Sign Languages: Involving the Linguistic Community*, 95–100. Paris: ELRA.

Kimmelman, Vadim, Roland Pfau & Enoch O. Aboh. 2019. Argument structure of classifier predicates in Russian Sign Language. *Natural Language & Linguistic Theory*. 1–41. https://doi.org/10.1007/s11049-019-09448-9.

Kimmelman, Vadim et al. 2019. Argument structure of classifier predicates: Canonical and non-canonical mappings in four sign languages. *Open Linguistics* 5. 332–353.

Kisch, Shifra. 2008. “Deaf discourse”: The social construction of deafness in a Bedouin community. *Medical Anthropology* 27(3). 283–313.

Klomp, Ulrika. 2019. Conditional clauses in Sign Language of the Netherlands: A corpus-based study. *Sign Language Studies* 19(3). 309–347.

Klomp, Ulrika. 2021. *A descriptive grammar of Sign Language of the Netherlands*. University of Amsterdam dissertation.

König, Susanne et al. 2012. Der Wortschatz der DGS. [The vocabulary of DGS]. In Hanna Eichmann, Martje Hansen & Jens Heßmann (eds.), *Handbuch Deutsche Gebärdensprache*, 77–112. Seedorf: Signum.

Koulidobrova, Elena. 2017. Elide me bare: Null arguments in American Sign Language. *Natural Language & Linguistic Theory* 35(2). 397–446.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In Johan Rooryck & Laurie Zaring (eds.), *Phrase structure and the lexicon*, 109–137. Springer.

Kratzer, Angelika. 2009. Making a pronoun: Fake indexicals as windows into the properties of pronouns. *Linguistic Inquiry* 40(2). 187–237.

Kuhn, Jeremy & Valentina Aristodemo. 2017. Pluractionality, iconicity, and scope in French Sign Language. *Semantics and Pragmatics* 10. https://doi.org/10.3765/sp.

Kwok, Lily, Stephanie Berk & Diane Lillo-Martin. 2020. Person vs. locative agreement: evidence from late learners and language emergence. *Sign Language & Linguistics* 23. 17–37. https://doi.org/10.1075/sll.00042.kwo.

Labov, William. 1975. *What is a linguistic fact?* Lisse: Peter de Ridder.

Lakoff, George & Mark Johnson. 2003. *Metaphors we live by*. Chicago, IL: The University of Chicago Press.

Landau, Idan. 2010. *The locative syntax of Experiencers*. Cambridge, MA: MIT Press.

Langer, Gabriele. 2012. A colorful first glance at data on regional variation extracted from the DGS-Corpus: With a focus on procedures. In Onno Crasborn et al. (eds.), *Proceedings of the 5th Workshop on the Representation and Processing of Signed Languages: Interactions between Corpus and Lexicon*, 101–108. Paris: ELRA.

Leeson, Lorraine & John Saeed. 2012. Word order. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 245–265. De Gruyter Mouton.

Legeland, Iris. 2016. *Agree or not? Congruentie in de Nederlandse Gebarentaal: Een corpus-gebaseerd onderzoek [Agree or not? Agreement in Sign Language of the Netherlands: A corpus-based study]*. University of Amsterdam Bachelor's Thesis.

Lepic, Ryan et al. 2016. Taking meaning in hand: Iconic motivations in two-handed signs. *Sign Language & Linguistics* 19(1). 37–81.

Levin, Beth. 1993. *English verb classes and alternations: a preliminary investigation*. Chicago, IL: University of Chicago Press.

Levin, Beth & Malka Rappaport Hovav. 1991. Wiping the slate clean: A lexical semantic exploration. *Cognition* 41(1-3). 123–151.

Levin, Beth & Malka Rappaport Hovav. 1995. *Unaccusativity*. Cambridge, MA: MIT Press.

Liddell, Scott K. 1986. Head thrust in ASL conditional marking. *Sign Language Studies* 52. 244–262.

Liddell, Scott K. 1995. Real, surrogate, and token space: Grammatical consequences in ASL. In Karen Emmorey & Judy Reilly (eds.), *Language, gesture and space*, 19–41. Mahwah, NJ: Lawrence Erlbaum.

Liddell, Scott K. 2000. Indicating verbs and pronouns: Pointing away from agreement. In Karen Emmorey & Harlan Lane (eds.), *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*. 303–320. Mahwah, NJ: Lawrence Erlbaum.

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

Liddell, Scott K. 2011. Agreement disagreements. *Theoretical Linguistics* 37(3/4). 161–172.

Lillo-Martin, Diane. 1986. Two kinds of null arguments in American Sign Language. *Natural Language & Linguistic Theory* 4(4). 415–444.

Lillo-Martin, Diane. 1991. *Universal Grammar and American Sign Language: Setting the null argument parameters*. Dordrecht: Kluwer.

Lillo-Martin, Diane. 1995. The point of view predicate in American Sign Language. In Karen Emmorey & Judy S. Reilly (eds.), *Language, gesture, and space*, 155–170. Mahwah, NJ: Lawrence Erlbaum.

Lillo-Martin, Diane. 2012. Utterance reports and constructed action. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, pp. 365–387. Berlin: De Gruyter Mouton.

Lillo-Martin, Diane & Edward S. Klima. 1990. Pointing out differences: ASL pronouns in syntactic theory. In Susan D. Fischer & Patricia Siple (eds.), *Theoretical issues in sign language research*, vol. 1, 191–210. Chicago, IL: University of Chicago Press.

Lillo-Martin, Diane & Richard P. Meier. 2011. On the linguistic status of ‘agreement’ in sign languages. *Theoretical Linguistics* 37(3/4). 95–141.
de Lint, Vanja. 2018. NGT classifier constructions: An inventory of arguments. *Sign Language & Linguistics* 21(1). 3–39.
Loos, Cornelia. 2014. *A class of their own: adjectives in ASL*. The University of Texas at Austin MA thesis.
Loos, Cornelia. 2017. *The syntax and semantics of resultative constructions in Deutsche Gebärdensprache (DGS) and American Sign Language (ASL)*. The University of Texas at Austin dissertation.
Lourenço, Guilherme. 2018. *Verb agreement in Brazilian Sign Language: Morphophonology, syntax & semantics*. Federal University of Minas Gerais dissertation.
Lourenço, Guilherme & Ronnie B. Wilbur. 2018. Are plain verbs really plain?: co-localization as the agreement marker in sign languages. In Vadim Kimmelman & Helen Koulidobrova (eds.), *FEAST Proceedings*, vol. 2, 68–81. https://www.raco.cat/index.php/FEAST/issue/view/26798/showToc.
Macht, Claudia. 2016. *Distribution von PAM in der Deutschen Gebärdensprache: Eine korpusbasierte Untersuchung [Distribution of PAM in German Sign Language: A corpus-based investigation]*. University of Hamburg MA thesis.
Macht, Claudia & Markus Steinbach. 2019. Regionalsprachliche Merkmale in der Deutschen Gebärdensprache [Regional language properties in German Sign Language]. In Joachim Herrgen & Jürgen Erich Schmidt (eds.), *Sprache und Raum. Ein internationales Handbuch der Sprachvariation. Band 4: Deutsch*, 914–935. Berlin: De Gruyter Mouton.
Malchukov, Andrej. 2005. Case pattern splits, verb types and construction competition. In Mengistu Amberber & Helen de Hoop (eds.), *Competition and variation in natural languages. The case for case*. 73–117. Oxford: Elsevier.
Malchukov, Andrej & Bernard Comrie (eds.). 2015. *Valency classes in the world’s languages*. Berlin: De Gruyter Mouton.
Mantovan, Lara & Carlo Geraci. 2018. R-impersonal interpretation in Italian Sign Language (LIS). *Sign Language & Linguistics* 21(2). 232–256.
Marsaja, Gede I. 2008. *Desa Kolok: a deaf village and its sign language in Bali, Indonesia*. Nijmegen: Ishara Press.
Mathur, Gaurav & Christian Rathmann. 2012. Verb agreement. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 136–157. Berlin: De Gruyter Mouton.
Matushansky, Ora. 2013. Gender confusion. In Lisa Lai-Shen Cheng & Norbert Corver (eds.), *Diagnosing syntax*, 271–294. Oxford: Oxford University Press.
McBurney, Susan L. 2002. Pronominal reference in signed and spoken language: Are grammatical categories modality-dependent? In Richard P. Meier, Kearsy Cormier & David Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*, 329–369. Cambridge: Cambridge University Press.
McBurney, Susan L. 2012. History of sign languages and sign language linguistics. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 909–948. Berlin: De Gruyter Mouton.
McEnery, Tony & Andrew Hardie. 2012. *Corpus linguistics: Method, theory and practice* (Cambridge textbooks in linguistics). Cambridge: Cambridge University Press.
McKee, Rachel et al. 2011. Variable “subject” presence in Australian Sign Language and New Zealand Sign Language. *Language Variation and Change* 23(3). 375–398.

Meier, Richard P. 1982. *Icons, analogues, and morphemes: The acquisition of verb agreement in ASL*. University of California San Diego dissertation.
Meier, Richard P. 1990. Person deixis in American Sign Language. In Susan D. Fischer & Patricia Siple (eds.), *Theoretical issues in sign language research*, vol. 1, 175–190. Chicago, IL: University of Chicago Press.
Meir, Irit. 1998. *Thematic structure and verb agreement in Israeli Sign Language*. Hebrew University of Jerusalem dissertation.
Meir, Irit. 2002. A cross-modality perspective on verb agreement. *Natural Language & Linguistic Theory* 20(2). 413–450.
Meir, Irit. 2012. The evolution of verb classes and verb agreement in sign languages. *Theoretical Linguistics* 38(1/2). 145–152.
Meir, Irit. 2016. Grammaticalization is not the full story: a non-grammaticalization account of the emergence of sign language agreement morphemes. In Jenny Audring, Francesca Masini & Wendy Sandler (eds.), *Quo vadis morphology? On-line Proceedings of the Tenth Mediterranean Morphology Meeting*, 112–124.
Meir, Irit et al. 2007. Body as subject. *Journal of Linguistics* 43(3). 531–563.
Meir, Irit et al. 2013. Competing iconicities in the structure of languages. *Cognitive Linguistics* 24(2). 309–343.
Meir, Irit et al. 2017. The effect of being human and the basis of grammatical word order: Insights from novel communication systems and young sign languages. *Cognition* 158. 189–207.
Mikone, Eve. 2001. Ideophones in the Balto-Finnic languages. In F. K. Erhard Voeltz & Christa Kilian-Hatz (eds.), *Ideophones*, 223–233. Amsterdam: John Benjamins.
Milković, Marina, Sandra Bradarić-Jončić & Ronnie Wilbur. 2006. Word order in Croatian Sign Language. *Sign Language & Linguistics* 9(1/2). 169–206.
Monaghan, Padraic et al. 2014. How arbitrary is language? *Philosophical Transactions of the Royal Society B: Biological Sciences* 369. https://doi.org/10.1098/rstb.2013.0299.
Müller, Gereon. 2009. Ergativity, accusativity, and the order of Merge and Agree. In Kleanthes K Grohmann (ed.), *Explorations of phase theory. Features and arguments*, 269–308. Berlin: Mouton de Gruyter.
Napoli, Donna J. & Rachel Sutton-Spence. 2014. Order of the major constituents in sign languages: Implications for all language. *Frontiers in Psychology* 5. 376. https://doi.org/10.3389/fpsyg.2014.00376.
Neidle, Carol et al. 2000. *The syntax of American Sign Language: Functional categories and hierarchical structure*. Cambridge, MA: MIT Press.
Newmeyer, Frederick J. 1992. Iconicity and Generative Grammar. *Language* 68(4). 756–796.
Nuckolls, Janis B. 1996. *Sounds like life*. New York, NY: Oxford University Press.
Nyst, Victoria. 2012. Shared sign languages. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 552–574. Berlin: De Gruyter Mouton.
Oomen, Marloes & Vadim Kimmelman. 2019. Body-anchored verbs and argument omission in two sign languages. *Glossa: A Journal of General Linguistics* 4(1). 42. https://doi.org/10.5334/gjgl.741.
Oomen, Marloes. 2017. Iconicity in argument structure: Psych-verbs in Sign Language of the Netherlands. *Sign Language & Linguistics* 20(1). 55–108.
Oomen, Marloes. 2018. Verb types and semantic maps. In Vadim Kimmelman & Helen Koulidobrova (eds.), *FEAST Proceedings*, vol. 2, 116–132. https://www.raco.cat/index.php/FEAST/issue/view/26798/showToc.

Oomen, Marloes. 2020. Spatial verbs are demonstration verbs. *Revista Linguística* 16(1). 227–249.
Oomen, Marloes & Roland Pfau. 2017. Signing NOT (or not): A typological perspective on standard negation in Sign Language of the Netherlands. *Linguistic Typology* 21(1). 1–51.
Padden, Carol. 1986. Verbs and role-shifting in American Sign Language. In Carol Padden (ed.), *Proceedings of the Fourth National Symposium on Sign Language Research and Teaching*, 44–57. Silver Spring, MD: National Association of the Deaf.
Padden, Carol. 1988. *Interaction of morphology and syntax in American Sign Language*. New York, NY: Garland.
Padden, Carol. 1990. The relation between space and grammar in ASL verb morphology. In Ceil Lucas (ed.), *Sign language research: theoretical issues*, 118–132. Washington, DC: Gallaudet University Press.
Padden, Carol et al. 2010. The grammar of space in two new sign languages. In Diane Brentari (ed.), *Sign languages*, 570–592. Cambridge: Cambridge University Press.
Padden, Carol et al. 2013. Patterned iconicity in sign language lexicons. *Gesture* 13(3). 287–308.
Pavlič, Matic. 2016. *The word order parameter in Slovenian Sign Language: Transitive, ditransitive, classifier and locative constructions*. Università Ca'Foscari dissertation.
Pendzich, Nina-Kristin. 2017. *Lexical nonmanuals in German Sign Language (DGS): An empirical and theoretical investigation*. Georg-August-Universität Göttingen dissertation.
Perniss, Pamela. 2007. *Space and iconicity in German Sign Language (DGS)*. Radboud Universiteit Nijmegen dissertation.
Perniss, Pamela, Robin L. Thompson & Gabriella Vigliocco. 2010. Iconicity as a general property of language: Evidence from spoken and signed languages. *Frontiers in Psychology* 1. 227. https://doi.org/10.3389/fpsyg.2010.00227.
Pesetsky, David & Esther Torrego. 2007. The syntax of valuation and the interpretability of features. In Simin Karimi, Vida Samiian & Wendy K. Wilkins (eds.), *Phrasal and clausal architecture: syntactic derivation and interpretation*, 262–294. Amsterdam: John Benjamins.
Pfau, Roland. 2008. The grammar of headshake: A typological perspective on German Sign Language negation. *Linguistics in Amsterdam* 1. 37–74.
Pfau, Roland & Suzanne Glück. 2000. The pseudo-simultaneous nature of complex verb forms in German Sign Language. In Nancy Mae Antrim et al. (eds.), *Proceedings of the Twenty-Eighth Western Conference on Linguistics*, 428–444. Fresno, CA: California State University.
Pfau, Roland & Josep Quer. 2007. On the syntax of negation and modals in Catalan Sign Language and German Sign Language. In Pamela Perniss, Roland Pfau & Markus Steinbach (eds.), *Visible variation: Comparative studies on sign language structure*, 129–161. Berlin: Mouton de Gruyter.
Pfau, Roland & Josep Quer. 2010. Nonmanuals: Their grammatical and prosodic roles. In Diane Brentari (ed.), *Sign languages*, 381–402. Cambridge: Cambridge University Press.
Pfau, Roland, Martin Salzmann & Markus Steinbach. 2018. The syntax of sign language agreement: Common ingredients, but unusual recipe. *Glossa: A Journal of General Linguistics* 3(1). 107. https://doi.org/10.5334/gjgl.511.
Pfau, Roland & Markus Steinbach. 2006. Modality-independent and modality-specific aspects of grammaticalization in sign languages. In *Linguistics in Potsdam*, vol. 24. Potsdam: Universitäts-Verlag.
Pizzuto, Elena. 1986. The verb system in Italian Sign Language. In Bernard T. Tervoort (ed.), *Signs of life: Second European Congress on Sign Language Research*, 17–31. Amsterdam: The

Dutch Foundation for the Deaf, Hearing Impaired Child, University of Amsterdam, & the Dutch Council of the Deaf.
Plaza-Pust, Carolina & Knut Weinmeister. 2008. Bilingual acquisition of German Sign Language and written language: Developmental asynchronies and language contact. In Ronice M. de Quadros (ed.), *Theoretical Issues in Sign Language Research 9*, 497–529. Petrópolis: Arara Azul.
Poizner, Howard, Ursula Bellugi & Ryan D. Tweney. 1981. Processing of formational, semantic, and iconic information in American Sign Language. *Journal of Experimental Psychology: Human Perception and Performance* 7. 430–440.
Quadros, Ronice Müller de. 1999. *Phrase structure of Brazilian Sign Language*. Pontifícia Universidade Católica do Rio Grande do Sul dissertation.
Quadros, Ronice Müller de & Josep Quer. 2008. Back to back(wards) and moving on: On agreement, auxiliaries and verb classes in sign languages. In Ronice M. de Quadros (ed.), *Theoretical Issues in Sign Language Research 9*, 530–551. Petrópolis: Arara Azul.
Quer, Josep. 2009. Agreement and argument structure in SLs: A case study in LSC psychological predications. Paper presented at *The Twenty-First European Summer School in Logic, Language and Information*. Bordeaux.
Quer, Josep. 2011. Reporting and quoting in signed discourse. In Elke Brendel, Jörg Meibauer & Markus Steinbach (eds.), *Understanding quotation*, 277–302. Berlin: De Gruyter Mouton.
Quer, Josep. 2021. Verb agreement: theoretical perspectives. In Josep Quer, Roland Pfau & Annika Herrmann (eds.), *The routledge handbook of theoretical and experimental sign language research*, 95–121. Abingdon, Oxon; New York, NY: Routledge.
R Core Team. 2016. *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing. https://www.R-project.org/.
Rathmann, Christian. 2003. The optionality of agreement phrase: Evidence from signed languages. In William E. Griffin (ed.), *The role of agreement in natural languages: Texas Linguistics Society 5 Proceedings*, 181–192. Austin, TX: Texas Linguistics Forum.
Rathmann, Christian. 2005. *Event structure in American Sign Language*. The University of Texas at Austin dissertation.
Rathmann, Christian & Gaurav Mathur. 2002. Is verb agreement the same cross-modally? In Richard P. Meier, Kearsy Cormier & David Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*, 370–404. Cambridge: Cambridge University Press.
Rathmann, Christian & Gaurav Mathur. 2008. Verb agreement as a linguistic innovation in signed languages. In Josep Quer (ed.), *Signs of the time: Selected papers from TISLR 2004*, 191–216. Hamburg: Signum.
Reddy, Michael J. 1979. The conduit metaphor: A case of frame conflict in our language about language. In Andrew Ortoni (ed.), *Metaphor and thought*, 284–310. Cambridge: Cambridge University Press.
Rizzi, Luigi. 1986. Null objects in Italian and the theory of *pro*. *Linguistic Inquiry* 17(3). 507–557.
Salo, Merja. 2011. Meteorological verbs in Uralic languages - are there any impersonal structures to be found. In Andrej Malchukov & Anna Siewierska (eds.), *Impersonal constructions: A cross-linguistic perspective*, 395–438. Amsterdam: John Benjamins.
Sandler, Wendy. 1989. *Phonological representation of the sign: Linearity and nonlinearity in American Sign Language*. Dordrecht: Foris.
Sandler, Wendy. 2011. Prosody and syntax in sign languages. *Transactions of the Philological Society* 108(3). 298–328.

Sandler, Wendy & Diane Lillo-Martin. 2006. *Sign language and linguistic universals*. Cambridge: Cambridge University Press.
Sapountzaki, Galini. 2012. Agreement auxiliaries. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 204–227. Berlin: De Gruyter Mouton.
Sauerland, Uli. 2004. A comprehensive semantics for agreement. Paper presented at *the Phi-Workshop*, McGill University. http://lumiere.ens.fr/~bspector/Heim/Sauerland_agreement.pdf.
Saussure, Ferdinand de. 1916. *Cours de linguistique générale [Course in general linguistics]*. Paris: Payot.
Schembri, Adam, Kearsy Cormier & Jordan Fenlon. 2018. Indicating verbs as typologically unique constructions: Reconsidering verb 'agreement' in sign languages. *Glossa: A Journal of General Linguistics* 3(1). 89. https://doi.org/10.5334/gjgl.468.
Schlenker, Philippe, Jonathan Lamberton & Mirko Santoro. 2013. Iconic variables. *Linguistics and Philosophy* 36(2). 91–149.
Schlenker, Philippe. 2014. Iconic features. *Natural Language Semantics* 22. 299–356.
Schlenker, Philippe. 2017. Super monsters I: attitude and action role shift in sign language. *Semantics and Pragmatics* 10. https://doi.org/10.3765/sp.10.9.
Schlenker, Philippe. 2018a. Locative shift. *Glossa: A Journal of General Linguistics* 3(1). 115. https://doi.org/10.5334/gjgl.561.
Schlenker, Philippe. 2018b. Visible meaning: Sign language and the foundations of semantics. *Theoretical Linguistics* 44(3/4). 123–208.
Schuit, Joke. 2013. *Signs of the Arctic: Typological aspects of Inuit Sign Language*. University of Amsterdam dissertation.
Shepard-Kegl, Judy. 1985. *Locative relations in American Sign Language: Word formation, syntax, and discourse*. Massachusetts Institute of Technology dissertation.
Siewierska, Anna. 2011. Overlap and complementarity in reference impersonals: Man-constructions vs. third person plural-impersonals in the languages of Europe. In Andrej Malchukov & Anna Siewierska (eds.), *Impersonal constructions: A cross-linguistic perspective*, 57–90. Amsterdam: John Benjamins.
Silverstein, Michael. 1976. Hierarchy of features and ergativity. In Robert M. W. Dixon (ed.), *Grammatical categories in Australian languages*, 112–171. Atlantic Highlands, NJ: Humanities Press.
Sloetjes, Han & Peter Wittenburg. 2008. Annotation by category – ELAN and ISO DCR. In *Proceedings of the Sixth International Conference on Language Resources and Evaluation*, 816–820. http://www.lrec-conf.org/proceedings/lrec2008/.
Steinbach, Markus. 2011. What do agreement auxiliaries reveal about the grammar of sign language agreement? *Theoretical Linguistics* 37(3/4). 209–221.
Steinbach, Markus. 2012. Plurality. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 112–136. Berlin: De Gruyter Mouton.
Steinbach, Markus & Annika Herrmann. 2013. Satztypen in Gebärdensprache [Sentence types in sign language]. In Jörg Meibauer, Markus Steinbach & Hans Altmann (eds.), *Satztypen des Deutschen*, 786–814. Berlin: de Gruyter.
Steinbach, Markus & Edgar Onea. 2016. A DRT analysis of discourse referents and anaphora resolution in sign language. *Journal of Semantics* 33(3). 409–448.
Steinbach, Markus & Roland Pfau. 2007. Grammaticalization of auxiliaries in sign languages. In Pamela Perniss, Roland Pfau & Markus Steinbach (eds.), *Visible variation: comparative studies on sign language structure*, 303–339. Berlin: Mouton de Gruyter.

Steriopolo, Olga & Marina Wiltschko. 2010. Distributed GENDER hypothesis. In Gerhild Zybatow et al. (eds.), *Formal studies in Slavic linguistics*, 155–172. New York, NY: Peter Lang.
Stokoe, William C. 2005. Sign language structure: An outline of the visual communication system of the American deaf. *Journal of Deaf Studies and Deaf Education* 10(1). (Original work 1960), 3–37.
Supalla, Ted. 1986. The classifier system in American Sign Language. In Colette Craig (ed.), *Noun classes and categorization*, 181–214. Amsterdam: John Benjamins.
Supalla, Ted. 1990. Serial verbs of motion in ASL. In Susan D. Fischer & Patricia Siple (eds.), *Theoretical issues in sign language research*, vol. 1, 127–152. Chicago, IL: University of Chicago Press.
Supalla, Ted & Elissa Newport. 1978. How many seats in a chair? The derivation of nouns and verbs in American Sign Language. In Patricia Siple (ed.), *Understanding language through sign language research*, 91–131. New York, NY: Academic Press.
Sze, Felix Y.B. 2003. Word order of Hong Kong Sign Language. In Anne Baker, Beppie van den Bogaerde & Onno Crasborn (eds.), *Cross-linguistic perspectives in sign language research: selected papers from TISLR 2000*, 163–191. Hamburg: Signum.
Sze, Felix Y.B. & Gladys Tang. 2018. R-impersonals in Hong Kong Sign Language. *Sign Language & Linguistics* 21(2). 284–306.
Talmy, Leonard. 2000. *Toward a cognitive semantics: Vol. 1. Concept structuring systems*. Cambridge, MA: MIT Press.
Tang, Gladys & Prudence Lau. 2012. Coordination and subordination. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 340–365. Berlin: De Gruyter Mouton.
Taub, Sarah F. 2000. Iconicity in American Sign Language: Concrete and metaphorical applications. *Spatial Cognition and Computation* 2(1). 31–50.
Taub, Sarah F. 2001. *Language from the body: iconicity and metaphor in American Sign Language*. Cambridge: Cambridge University Press.
Taub, Sarah F. 2012. Iconicity and metaphor. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 388–412. Berlin: De Gruyter Mouton.
Thompson, Robin L., Karen Emmorey & Robert Kluender. 2006. The relationship between eye gaze and verb agreement in American Sign Language: An eye-tracking study. *Natural Language & Linguistic Theory* 24(2). 571–604.
Thompson, Robin L. et al. 2013. The road to language learning is iconic: Evidence from British Sign Language. *Psychological Science* 23(12). 1443–1448.
Travis, Lisa. 1984. *Parameters and effects of word order variation*. Massachusetts Institute of Technology dissertation.
Tsunoda, Tasaku. 1981. Split case-marking in verb types and tense/aspect/mood. *Linguistics* 19(5/6). 389–438.
Tsunoda, Tasaku. 1985. Remarks on transitivity. *Journal of Linguistics* 21(2). 385–396.
Valli, Clayton & Ceil Lucas. 1992. *Linguistics of American Sign Language: A resource text for ASL users*. Washington, DC: Gallaudet University Press.
Vermeerbergen, Myriam et al. 2007. Constituent order in Flemish Sign Language (VGT) and South African Sign Language (SASL). *Sign Language & Linguistics* 10(1). 25–54.
de Vos, Connie. 2012. *Sign-spatiality in Kata Kolok: How a village sign language of Bali inscribes its signing space*. Radboud University Nijmegen dissertation.
Whitney, William Dwight. 1875. *The life and growth of language: An outline of linguistic science*. New York, NY: D. Appleton & Company.

Wilbur, Ronnie B. 1999. Metrical structure, morphological gaps, and possible grammaticalization in ASL. *Sign Language & Linguistics* 2(2). 217–244.
Wilbur, Ronnie B. 2003. Representations of telicity in ASL. *Chicago Linguistics Society* 39(1). 354–368.
Wilbur, Ronnie B. & Cynthia Patschke. 1999. Syntactic correlates of brow raise in ASL. *Sign Language & Linguistics* 2(1). 3–41.
Winston, Charlotte. 2013. *Psychological verb constructions in American Sign Language*. Purdue University MA thesis.
Woll, Bencie, Rachel Sutton-Spence & Elton Frances. 2001. Multilingualism: The global approach to sign languages. In Ceil Lucas (ed.), *The sociolinguistics of sign language*, 8–32. Cambridge: Cambridge University Press.
Worseck, Thomas. 2014. Gehörlosenvereine und Gehörlosenverbände in Deutschland [Deaf societies and deaf associations in Germany]. In Anne Beecken et al. (eds.), *Grundkurs Deutsche Gebärdensprache I*, 93–95. Hamburg: Signum.
Wulf, Alyssa et al. 2002. Variable subject presence in ASL narratives. *Sign Language Studies* 3(1). 54–76.
Zeshan, Ulrike. 2004a. Hand, head, and face: Negative constructions in sign languages. *Linguistic Typology* 8(1). 1–58.
Zeshan, Ulrike. 2004b. Interrogative constructions in signed languages: Crosslinguistic perspectives. *Language* 80(1). 7–39.
Zeshan, Ulrike & Waldemar Schwager. 2008. Word classes in sign languages. Criteria and classifications. *Studies in Language* 32(3). 509–545.
Zwitserlood, Inge. 2012. Classifiers. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language: An international handbook*, 158–186. Berlin: De Gruyter Mouton.

Index

ϕ-features, 153, 257, 259, *see also* referent features, person features
PAM, 13–14, 20, 140–141, 266, 283–285

action role shift, *see* role shift
affixation (pronominal), 152, 297
agent-backgrounding, 16–17, 288, *see also* impersonal construction
Agree, 261–262, 273–275, 277, 280, 284, 296
agreement auxiliary, 13–14, 193, 283
agreement marking, 41–43, 57, 153, 188, 208–215, 227–228, 243, 253, 295–296, 303–304
– congruence, 166, 170–172, 174, 205–206
– incongruence, 171, 173, 180, 182, 206, 209, 210
– optionality, 190–191, 195–196, 210, 227, 271, 286–287, 295, 300, 303
agreement verbs, 9, 63, 78–80, 110–117, 126–128, 185–220, 222, 247, 271–274, 295
– backward, 11, 86, 112, 186, 192–194, 201, 207, 213, 240
– backward verbs, 273–274
Al-Sayyid Bedouin Sign Language, 57, 132–133, 306
American Sign Language, 5, 12, 14–16, 20, 47, 81, 86, 90–91, 103–104, 133, 137, 143, 151–154, 162, 169, 188, 189, 193, 195, 215–216, 226, 243, 249, 253, 295, 300
animate argument, 160, 168, 175, 178, 228, 276–277, 286
argument-structure alternation, 142, 159, 162
– causative-inchoative, 142, 162, 163, 226
– unspecified object, 143, 162, 226
Australian Sign Language, 14–15, 47, 173–174, 188, 190, 195, 227, 248, 303

body as subject, 93, 98, 132–134, 196, 256, 270
body-anchored verbs, 9, 61, 71–75, 95–104, 120–122, 131–150, 252–271, 274, 296
Brazilian Sign Language, 153, 155, 193–194, 229, 242, 249, 275, 307
British Sign Language, 188, 190–191, 195, 206, 209–210, 227, 248, 303–304

case, 57, 58, 66, 301
– case-frames, 66–68
Catalan Sign Language, 13, 16–17, 86, 193, 288
center (signing space), 166, 167, 171–172, 174, 180, 182, 201, 206–207, 228–229, 276–277, 287, 289–290, 296, 307
classifier predicates, 12, 46, 61, 84, 93–94, 112, 120, 162, 230, 237–239, 243–244, 247, 297
clause boundaries, 32, 45–46
clitic (pronominal), 151–152, 154
constituent order, 6, 34, 136–141, 156–159, 196–200, 223–225, 279–283, 305
corpus linguistics, 22–23, 27–51, 302–305

Danish Sign Language, 61, 86, 133, 153, 188, 195
demonstration, 237, 243–246, 297
– continuum, 237, 247–249
DGS Corpus, 23, 24, 27–30
diachronic change, 61, 69, 87–88, 193, 306
directionality, 81, 83, 110, 126, 143, 153, 186, *see also* path movement

empty topic, 253, 285
ergative agreement, 194, 273
event participants, 58, 95, 98, 117, 119, 126, 276
– agent, 99, 100, 112, 126, 133, 166, 246
– causer, 67, 122
– experiencer, 58, 67, 74, 100, 101, 103, 121, 134, 255, 270
– instrument, 96, 104, 112
– patient, 126, 166, 239
– stimulus, 58, 67, 122
– theme, 134
external argument, 166, 178–181, 228
eye gaze, 169, 253, 288

feature mismatch, 258, 260–266
foreigner talk, 149

https://doi.org/10.1515/9783110742787-015

gender mismatch, 260–263, *see also* feature mismatch
Generative Grammar, 19, 26
German Sign Language, 20–21, 295–297
gesture, 113, 190, 192, 238
Greek Sign Language, 13

handshape, 120
– body-part, 93, 101, 107, 108, 120, 238
– handling, 93, 97, 106, 110, 120, 122, 124, 126, 162, 238, 246
– instrument, 120, 122, 124
– whole-entity, 93, 97, 105, 107, 108, 115, 120, 124, 126, 162
Head Movement Constraint, 281
Hong Kong Sign Language, 17
hybrid verbs, 58, 80–85, 107, 114, 117, 143, 167, 187, 207, 209, 274, 297

iconic mapping, 58–59, 90–117, 119, 132–133, 172, 298
iconicity, 17–19, 244, 274, 298
– lexical, 18, 90
– structural, 19, 136, 263, 265–266, 292, 307
impersonal construction, 17, 49, 63, 142, 148, 161, 163, 288–290, 303
impoverishment rule, 195, 287
inanimate argument, 160, 172, 175, 178, 228, 276–277, 286
indicating verbs, 190
internal argument, 153, 154, 166–177, 228
interrogative construction, 149, 182, 267
Inuit Sign Language, 188, 195
Israeli Sign Language, 13, 41, 58, 61, 86–87, 132–134, 153–154, 166, 175, 183, 188, 193, 195, 256, 306
Italian Sign Language, 17, 133, 188, 195

Japanese Sign Language, 8

Kata Kolok, 57

language universals, 4, 63, 302
lexical plurality, 108
lexicalization, 94, 132
listability problem, 192
localization (neutral verbs), 151–155, 166–181, 187, 228–229, 286–287
locative constituent, 159, 161, 200, 225, 238
locative shift, 241
locus alignment, 167, 175, 226–230, 240, 245, *see also* agreement marking

Maxim of Quantity, 245
metaphor, 18, 91, 102, 107, 117, 122, 134, 254
metonymy, 101
mixed agreement, *see* feature mismatch

neutral verbs, 10, 61, 76, 104–110, 122–126, 131, 151–184, 275–278, 296
New Zealand Sign Language, 14–15
non-manual markers, 5–6, 92, 267
null argument
– object, 285–286
– subject, *see* subject drop

object shift, 282–283
object-over-subject primacy, 133, 256

partial null-subject languages, 252
passives, 16, 290
path movement, 3, 9, 13, 16, 40, 58, 82, 92, 100, 110–113, 126, 186, 193, 243, 300
person (grammatical), 7–8, 231, 253
– first, 15, 135–136, 141, 146–148, 157, 167, 175, 182, 191, 215, 227, 253, 258, 296
– second, 135, 141, 148–150, 181, 232, 257, 267
– third, 15, 135, 147–148, 182, 215, 227, 231, 262, 285
person agreement marker, *see* PAM
person features, 191, 192, 253–256
phonological assimilation, 168, 170
phonological constraints, 140, 152, 155, 167, 229, 275, 278, 302
phonological parameters, 5, 92
phonological reduction, 103
plain verbs, 9, 62, 131–132, 224, 253, 299
pronoun copy, 137
pronouns, 7–8, 259–260, *see also* person (grammatical)
psych-verbs, 102, 134–136, 145, 146, 253–255, 299

question, *see* interrogative construction
quotation, 244

R-index, 192
R-locus, 7, 168, 174, 178, 192, 244, 257
reciprocal (lexical form), 84
reference tracking, 257, 260, 262
referent features, 256–260, 272, 302
referentiality, 282, 290, 296, 307
resultative construction, 142
role shift, 6, 39, 81, 135, 139, 143, 181, 191, 196, 198–199, 244
– non-quotative, 6, 147–150, 231, 268–269
– quotative, 6, 147–149, 201
Russian Sign Language, 17, 48, 146, 161, 165, 221, 232, 246, 266, 307

semantic map, 57, 60–61, 63–85
– of transitivity splits, 65–68, 120–128, 298, 306
shared sign languages, 57
Sign Language of the Netherlands, 14–15, 19, 20, 86, 87, 92, 102, 134–137, 145, 146, 148, 152–153, 188, 195, 224, 231, 253–255, 299, 303, 307
Spanish Sign Language, 13, 133, 153–155, 166, 188, 195
spatial verbs, 9, 63, 78–80, 110–117, 126–128, 185–220, 237–250, 297, 307
subject drop, 14–15, 134–135, 146–150, 181–183, 215–219, 222, 230–233, 240, 243, 246, 260, 266, 288, 299
– licensing conditions, 246–249, 252–253
Swedish Sign Language, 48
symmetric verbs, 163, 176, 223

topicalization, 137, 140, 157, 198, 200, 224
transfer, 11, 57–58, 80, 110, 115, 133
transitivity, 25, 57–61, 124, 301
– degree of, 120, 124, 298
– dimension of, 119, 298
Transitivity Hypothesis, 65–66
Turkish Sign Language, 17

valency, 141–146, 159–165, 201–204, 226
ValPaL list, 30–31, 61, 74, 295, 304
verb classification, 8–12, 58–61, 85, 226, 295, 298, 307
verb type, *see* verb classification