Research Article

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Interaction of the differential object marker PAM with other prominence hierarchies in syntax in German Sign Language (DGS)

Abstract: There has been growing debate about the special status of object marking in sign languages. In this article, we contribute evidence for the existence of a differential object marker in DGS (German Sign Language). Based on data from the Public DGS Corpus, we investigate the behavior of this sign, glossed as PAM, in different morphosyntactic environments to understand its interaction with different morphosyntactic phenomena involved in marking argument structure. We focus on constituent order, verb modification, and argument realization as phenomena sensitive to relations of prominence among arguments. Although the accumulation of different markers of prominence, e.g., argument marking with PAM and through verb modification, may occur, we argue that PAM occurs primarily when other markers of object prominence – in particular, changes in constituent order and verb modification – do not occur, and see the main motivation for the use of PAM in the prominence-lending semantic properties in the nominal and verbal domains. In addition, based on our analyses, we argue against the existence of two related PAM signs, with distinct agreement marking and differential object-marking function. We also argue against an analysis of PAM as a preposition-like element. Instead, we propose an analysis of PAM in terms of differential argument indexing, sensitive to semantic and pragmatic features of both subject and object arguments.

Keywords: German Sign Language (DGS), differential object marking, prominence, constituent order, argument realization, verb modification, agreement

1 Introduction

The meaningful use of space is one of the defining modality-specific features of the grammatical organization of sign languages. A central debate has revolved around the nature of spatial modification to indicate argument roles, as happens, for example, in verbs that are specified for path movement. The debate centers around the nature of the linguistic phenomenon, whether it is agreement, cliticization, or a hybrid gestural form (Lillo-Martin and Meier 2011, Nevins 2011, Pfau et al. 2018, Schembri et al. 2018). In addition, many sign languages have signs that commonly appear with verbs not specified for path movement. These signs have been analyzed as agreement auxiliaries, on the assumption that they agree with (or indicate) arguments through spatial modification when the verb cannot (Sapountzaki 2012). For German Sign Language (DGS), recent discussion has centered around the nature of the sign

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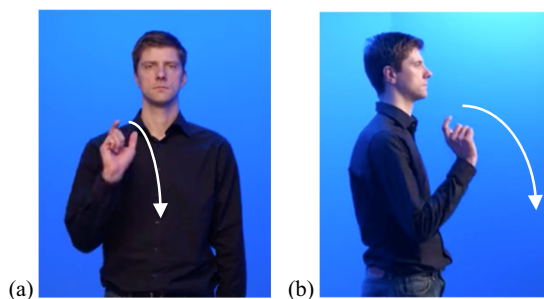
Figure 1: Example of the sign PAM from the Public DGS Corpus, front view in (a) and side view in (b) (doi: 10.25592/dgs.corpus-3.0-type-15599).

glossed as PAM (Figure 1), specifically its status as an agreement auxiliary/marker or differential object marker (Bross 2020, Steinbach 2022, de Souza Santos et al. 2025; see also Börstell 2019).

Bross (2020) and de Souza Santos et al. (2025) argue for an analysis of PAM as a differential object marker, based on semantic properties of animacy, definiteness, and object affectedness – albeit with substantially different conclusions regarding the role of these properties, as explained in more detail in the following. Steinbach (2022) argues for the existence of two versions of PAM, with differing syntactic distribution: a postverbal agreement marker, glossed as $_x$PAM$_y$, and a preverbal differential object marker, glossed as PAM$_x$. In this article, we contribute to this debate by investigating the behavior of PAM in different morphosyntactic environments. We provide additional arguments for an analysis of PAM as a differential object marker, based on the interaction of PAM with different syntactic phenomena involved in marking argument structure. In particular, we focus on constituent order, verb modification, and argument realization.

This article is structured as follows. We provide the theoretical background in Section 2, starting with a description of the different morphosyntactic phenomena we consider relevant to understanding the behavior of PAM and important to informing an analysis of PAM, including an overview of the current state of the debate on the analysis of PAM in DGS. We link these phenomena to prominence effects, assuming prominence to motivate the realization of argument structure, in general, and highlighting the role of prominence for a differential object-marking account of PAM. We present our specific research questions in Section 3 and outline our methodology in Section 4. The results of our analysis are presented in Section 5. We lay out our arguments in support of a differential object-marking analysis of PAM in Section 6 and conclude the article in Section 7.

2 Theoretical framework

2.1 Sign order

Sign languages described to date have been shown to exhibit primarily subject-verb-object (SVO) or subject-object-verb (SOV) constituent orders. Some languages have been described as having either SVO or SOV basic underlying order (see Leeson and Saeed 2012 for a review); however, it has been suggested that most sign languages are characterized by both SVO and SOV (Napoli and Sutton-Spence 2014; Napoli et al. 2017). Based on a literature review of constituent order data from more than 40 sign languages, Napoli and Sutton-Spence (2014) argue that constituent order is determined to a large extent by modality-specific phonological considerations, in particular, that O will precede V if it affects the form of the verb. For example, the handshape and position of the hands differ in *carrying a box* compared to *carrying a suitcase*, corresponding to their different semantics. The argument also applies to verbs that move through space to indicate arguments: the relevant arguments should already be introduced if the addressee is to make sense of the path of movement of the predicate (i.e., to identify the arguments associated with the beginning and end locations of the verb).

Pressures that have to do with avoiding potential ambiguity of grammatical roles, i.e., pressures that are not modality-specific, are also noted by Napoli and Sutton-Spence (2014), notably that SVO is favored in reversible sentences (see also Hall et al. 2013, Schouwstra et al. 2022 for similar evidence from silent gesture). In addition, Napoli et al. (2017) argue that event type affects constituent order, showing for Libras (Brazilian Sign Language) that verbs with extensional objects (i.e., objects that exist; *eat an apple*) are preferably realized with SOV constituent order, while verbs with intensional objects (i.e., objects that are presupposed (not) to exist; *want an apple*) are more likely to be realized with SVO order. They also note the relationship between constituent order and definiteness cross-linguistically (Tomlin 1986) and point out the more likely combination of extensional verbs with definite objects and intensional verbs with indefinite objects, respectively, and that more research is needed to understand the relationship between event type, constituent order, and definiteness.

For DGS, the basic sign order is generally assumed to be SOV (Happ and Vorköper 2006, Steinbach and Herrmann 2013, Oomen 2021, Steinbach 2022). However, based on an analysis of DGS corpus data, Oomen (2021) finds that constituent order is influenced by verb type, which is consistent with observations by Napoli and Sutton-Spence (2014). Specifically, Oomen (2021) finds that body-anchored plain verbs favor SVO constituent order, while agreement (or indicating) verbs (i.e., verbs that move between locations in space) as well as neutral plain verbs (i.e., verbs without movement, but produced in the space in front of the signer's body) favor SOV constituent order. Oomen (2021), nevertheless, assumes that SOV is the basic constituent order in DGS, based on the possibility of being able to syntactically derive SVO order from an underlying SOV order and assumptions in the previous literature (see also Bross and Hole 2017, Bross 2018, Pfau et al. 2018). In the present study, we aim to shed light on the different constituent orders found in naturalistic data by bringing in the notion of prominence and the interaction with other phenomena, in particular, verb type, spatial modification behavior, and the use of PAM.

Both of the dominant constituent orders share a subject-first position. The preference for a subject-first order reflects a more general agent-first principle (e.g., Primus 2001) and can be further described in terms of a prominence-based approach to constituent order and its alternations. The prototypical agent is human and the initiator of events. As such, the agent is an inherently prominent element, grounded in both cognitive and evolutionary explanations (Himmelmann and Primus 2015). The prominence of the agent is reflected cross-linguistically by being placed in first position in clauses. In the association between agents, subjects, and humans as the best candidates for the first syntactic position, there is some potential circularity: the subject is inherently prominent because it occupies the first position, and the first syntactic position is inherently prominent because it is occupied by the subject. It is the prominence of the agent that is at the root here: the agent is understood cognitively as the most important element of the event, as the initiator and causer of the event, with volition, control, and autonomous movement.

Building on these assumptions, linguistic contexts can be imagined where these three elements (agent, human, and subject) come into opposition, essentially resulting in argument competition in syntax (Himmelmann and Primus 2015). Argument competition occurs when two or more arguments compete for prominence, i.e., compete to be the center of linguistic (and cognitive) attention. On the one hand, there are inherently prominent elements (associated with the agent), as mentioned earlier. However, prominence can be attributed to other elements, attracting attention, in certain linguistic contexts. An example of this are passive constructions, where the agent is demoted to the object position while the (initial) subject position is occupied by the patient. Here, a clear competition between arguments is evident, with the agent, being inherently prominent, losing syntactic prominence to the patient, which in turn occupies the subject position, and in most cases, the first position in the sentence. It is worth noting that the notion of subject and object is not clear on independent grounds for the most part in the syntax of sign languages. An investigation of grammatical categories based on consistent syntactic behavior has been carried out for only a few sign languages (e.g., Jantunen 2008 for Finnish Sign Language [FinSL]; Johnston 2019 for Australian Sign Language [Auslan]). In both of these studies, there was little evidence of strict grammatical structures or morphosyntactic markers that would allow the attribution of argument status as subject and object, independent of semantic roles and constituent order. Based on the association between agent and subject as reflecting prominence in semantic and syntactic terms, we assume that arguments in first position are more prominent than arguments in non-first position and that agents are typically subjects.

2.2 Verb modification

Although the analyses vary, from agreement to cliticization to hybrid gestural accounts (Pfau et al. 2018), there is consensus that verbs can be spatially modified in different ways, through changes in palm orientation and/ or direction of movement of the hand(s), to reflect their arguments. There are different accounts of how arguments may be realized or identified, including association of the location of the hands with locations associated with referents (Lillo-Martin and Meier 2011); the use of eye gaze directed at referents, in particular, the object referent (Neidle 2000); and the use of the body to represent referents, in particular, the subject referent (Meir et al. 2007). Verbs that have been called agreement or indicating verbs in the literature (Pfau et al. 2018) undergo spatial modification, i.e., movement in space, in relation to both the subject and the object referents. For DGS, the modification of verbs that move through space for argument marking has been analyzed as being obligatory (Oomen 2021, Steinbach 2022). Note, however, that this is based on corpus analysis findings by Oomen (2021) that roughly 93% of spatially modifiable verbs are "at least congruent" (p. 227) with their subject and object arguments, where congruent means that locations in space coincide with the citation form production of the verb forms. For British Sign Language (BSL), in contrast, verb modification has not been found to be obligatory and has been described as depending on semantic factors, such as animacy (Fenlon et al. 2018). With respect to the spatial modification of verbs to indicate the patient/object argument, in particular, Fenlon et al. (2018) found that verbs are modified more frequently when the patient is human than when the patient is inanimate. The BSL data also contain proportions of verbs that are clearly modified or congruent with citation form production, but as Oomen (2021) notes, the proportion of clearly unmodified tokens is higher in the BSL data (roughly 30%) reported by Fenlon et al. (2018). Interestingly, Pfau et al. (2018) note a lack of investigation of the nature of argument marking for DGS, but assume similar factors motivating analyses of optional marking (as for BSL; also for Australian Sign Language by De Beuzeville et al. 2009) to hold for DGS, as well.

From the perspective of prominence, the modification of the verb to indicate the patient can be seen as providing additional information that generates active attention to the patient (Himmelmann and Primus 2015). On an assumption of optional marking, as in BSL, modification is additional morphosyntactic marking that happens only in certain contexts. For BSL, these contexts are conditioned by features traditionally relevant to prominence, namely, the animacy of referents. The behavior of the verb is thus influenced by the animacy of the object, reflecting prominence-lending features of the object. Based on these findings, we assume that the spatial modification of verbs to indicate arguments is a prominence-marking device. In particular, the spatial modification of verbs to indicate the object can be interpreted as attributing prominence to the object.

2.3 Omission of arguments

Many sign languages have been described as allowing argument omission, akin to pro-drop languages (Lillo-Martin 1991, Glück and Pfau 1998, McKee et al. 2011, Jantunen 2008, Johnston 2019, Oomen 2021). This phenomenon is related to a large extent to verb types. On the one hand, agreement (or indicating) verbs are said to license argument omission (e.g., Lillo-Martin 1991). Similarly, due to an association of the body with the subject (Meir et al. 2007), body-anchored plain verbs have been described as licensing omission of subjects (Oomen 2017, Oomen and Kimmelman 2019). Specifically, Oomen (2017) shows that body-anchored psych verbs in Sign Language of the Netherlands (NGT) allow null subjects only for first-person subjects, but not for non-first-person arguments, due to the iconically motivated association between first person and the body of signer. The same pattern is found by Oomen and Kimmelman (2019) for all types of body-anchored verbs in DGS and Russian Sign Language, with the same iconicity-based (body as first person) explanation. Other plain verbs, on the other hand (i.e., neutral plain verbs, which do not move through space, but which can agree with (or indicate) an argument through placement in space), allow all types of null subjects. On this account, we can infer that a non-overt first person as subject is easy to recover, but that the same may not be true for (non-overt) objects. Proske (2022) shows that body-anchored transitive verbs rarely omit the object. She refers to Oomen (2021) to explain that in body-anchored verbs, the body-as-subject phenomenon is particularly strong

(Meir et al. 2007). With the subject mapped onto the signer's body, the object tends to be realized overtly to saturate the sentence. The possibility of subject omission arises from the understanding that the signer's body can be interpreted as the realized subject (Meir et al. 2007). In the same vein, subjects that are not first person tend to be marked morphologically, to preclude the interpretation that the signer is first person.

In terms of prominence, it is possible to consider how the overtness of an argument can give it more or less prominence. From a discourse perspective, given and definite referents are more prominent than new and indefinite referents. Argument drop is thus also linked to how a referent can be recovered in discourse. The higher the discursive prominence of a referent, the greater the possibility of its omission (e.g., Ariel 1990). On a prominence account, prominent elements license linguistic operations (Himmelmann and Primus 2015). A prominent referent based on discourse cues may be zero-marked (and non-overt arguments may be higher in prominence than overt arguments), while a prominent element based on semantic cues (e.g., animacy) may receive special morphosyntactic marking (and a referent with marking may be more prominent than a referent without marking, as with differential object marking). There is no one-to-one correspondence between the prominence of referents and the linguistic expression or operation that marks the prominence.

2.4 Analysis of PAM in DGS

The original analysis of the sign glossed as PAM in DGS as an agreement auxiliary is reflected in its name: PAM stands for Person Agreement Marker (Rathmann 2000) and denotes a sign that functions as a subject–object agreement auxiliary (Steinbach and Pfau 2007), or simply agreement auxiliary, in contexts where the verb cannot move through space to indicate its arguments. In a new analysis, based on acceptability judgments and sentence translations from German, Bross (2020) suggests that PAM is not an agreement auxiliary, but rather a preposition-like element that is used as a differential object marker and related to animacy, definiteness, and affectedness. He finds that PAM is used obligatorily with emotionally/mentally affected animate objects and that PAM forces a definite reading of the object when used with verbs of (effective) action and perception (verbs high on Tsunoda's (1985) affectedness hierarchy). Syntactically, Bross (2020) assumes that two usage patterns associated with PAM exist, a clause-internal pattern (i.e., either S-PAM-O-V or S-V-PAM-O) and a clause-final pattern (i.e., S-O-V-PAM). Furthermore, he notes a preference for clause-internal patterns by the signers consulted for the study. Bross (2020) leaves open the possibility that PAM may function as an auxiliary in some dialects of DGS, stressing the applicability of his analysis to what he calls Southern DGS. Although not focusing specifically on the use of PAM, Proske (2022) and Oomen (2021) find support for Bross' (2020) differential object marking account for the use of PAM on the grounds of animacy restrictions (see also Murmann 2012, Macht 2016, de Souza Santos et al. 2025). In addition, Proske (2022) finds that the use of PAM in preverbal position (a clause-internal pattern) shows spatial modification only for the object argument, which is consistent with a differential object-marking analysis.

Based on a review of previous literature on the behavior of PAM, Steinbach (2022) concludes that two versions of PAM exist. The first is an agreement marker, glossed by Steinbach (2022) as $_x$PAM$_y$, and the second is a differential object marker, glossed as PAM$_x$. Steinbach (2022) distinguishes their use based on different syntactic behavior (and structure): the agreement marker occurs postverbally and agrees with (or indicates) both the subject and object arguments (through spatial modification), while the differential object marker occurs preverbally and marks only the object argument. Steinbach (2022) notes that an animacy constraint applies to the use of both forms, given that both forms are assumed to be grammaticalized from the nominal sign PERSON. On Steinbach's (2022) derivation, the postverbal position of $_x$PAM$_y$ allows agreement with (modification for) subject and object arguments in the same way as agreement (indicating) verbs. In contrast, preverbal PAM$_x$ only marks the object and is DP-internal or PP-internal (thus remaining neutral on the word class of PAM$_x$). Steinbach (2022) notes that the different structures associated with $_x$PAM$_y$ and PAM$_x$ are compatible with the co-occurrence of agreement (indicating) verbs inflected for subject and object arguments. On the original account of PAM as an agreement auxiliary, this behavior is unexpected, as the auxiliary was assumed to be used to mark arguments when the verb could not. However, a 'doubling up' of argument marking – using both spatially modifiable verbs and PAM – has been previously noted in the literature (Rathmann 2003, Steinbach and Pfau

2007, Bross 2020, Proske 2022). In fact, Proske (2022) found PAM used more frequently with indicating verbs than with plain verbs (that do not move through space). However, Proske (2022) found PAM to be used primarily preverbally, which would suggest PAM$_x$ (the differential object marker) and not $_x$PAM$_y$ (the agreement marker) in Steinbach's (2022) terms.

Overall, the verbs that occurred with PAM in Proske (2022) – using a sentence repetition task, in which spontaneous instances of PAM insertion were observed – are consistent with findings by Bross (2020) and de Souza Santos et al. (2025) supporting a differential object-marking analysis. Both Bross (2020) and de Souza Santos et al. (2025) discuss evidence for the use of PAM being related to object affectedness, albeit in substantially different ways. Bross (2020), as mentioned previously, relates the use of PAM to affectedness based on Tsunoda's (1985) verb hierarchy. Specifically, he claims that the verb classes of Pursuit, Knowledge, and Feeling (alternatively: verbs with mentally/emotionally affected objects) occur obligatorily with PAM, while verbs higher in object affectedness result in a definite reading of the object when occurring with PAM – i.e., PAM marks highly affected definite objects. De Souza Santos et al. (2025) also observe the strong connection between animacy and definiteness traits: PAM is predominantly associated with human and definite, i.e., highly individuated (Aissen 2003), objects, but with little evidence of affectedness playing a systematic role. Instead, they argue that the degree to which the object argument exhibits semantic properties prototypically attributed to the agent is important. In particular, their corpus analysis of PAM reveals three main contexts in which PAM is used: (i) verbs with stimulus objects (Malchukov 2005) causing a change in the mental/emotional state of an experiencer subject (e.g., *love*); (ii) interactional content verbs where PAM marks the recipient (indirect object) of information (e.g., *recommend*); and (iii) verbs with non-prototypical, animate, agent-like patients (e.g., *help*). De Souza Santos et al. (2025) suggest that the use of PAM is related to the linguistic prominence of the object. Under this view, the use of PAM as a differential object marker is interpreted as an element that assigns syntactic prominence to the verb's object, particularly in the case of highly individuated objects (animate and definite). PAM is thus a marker associated with arguments with more prominent characteristics, such as individuation and initiation, which, according to Himmelmann and Primus (2015), are characteristics of the agent, which is inherently prominent, drawing passive attention. Therefore, when the patient, in certain cases, has some of the agent's characteristics, it becomes more prominent than the agent, attracting active attention.

3 Present study

In the present study, we aim at extending our understanding of the use of PAM by investigating its interaction with other means of marking argument roles and structure as outlined in the previous section. In doing so, we also aim at a more comprehensive understanding of prominence relations: assuming a relationship of PAM with semantically prominent elements, it is necessary to explore the notion of prominence in syntax. We ask whether it is possible to understand the interaction of the use of PAM with sign order, verb modification, and argument omission on a prominence-based account, assuming these other mechanisms to themselves be sensitive to prominence relations. Regarding constituent order, we assume that the (linearly) first syntactic position is more prominent than non-first position. In terms of verb modification, we assume that modified is more prominent than non-modified (Fenlon et al. 2018). For argument realization, following assumptions about accessibility hierarchies, we assume that non-overt arguments are more prominent than overt arguments. For PAM itself, we assume that marking with PAM is more prominent than no marking with PAM. Our overall objective is to investigate the interaction of different syntactic factors in sentences with PAM in DGS, focusing on the behavior of constituents, verbs, and arguments in sentences with PAM. In addition, we seek further evidence for or against the existence of two related, but separate forms, i.e., an agreement marker and a differential object marker (Steinbach 2022), and discuss the syntactic function of PAM as a preposition-like (Bross 2020) or other type of element.

We hypothesize that PAM is a differential object marker whose main syntactic function is to mark the object. We further hypothesize that PAM marking of prominent objects (i.e., highly individuated and event-initiating objects; de Souza Santos et al. 2025) is a sufficient marker of prominence, in the sense that it does not depend on an accumulation of prominence marking along other dimensions (i.e., sign order, verb modification, or argument realization).

4 Methodology

4.1 Data: Public DGS corpus

Our analysis is based on naturalistic data available in the Public DGS Corpus (Konrad et al. 2020). The public corpus consists of 50 hours of video recordings, comprising data collected from pairs of signers engaged in free-form dialogues on various topics from across Germany (Berlin, Brandenburg, Bremen, Hamburg, Hesse, Lower Saxony, Mecklenburg-Vorpommern, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, Saxony, Saxony-Anhalt, and Schleswig-Holstein) and balanced across four age groups (18–30 years; 31–45 years; 46–60 years; and 61 and above) (Schulder et al. 2024). All data were collected in a recording studio with a blue background, using three cameras positioned to the side of and in front of the interlocutors. The corpus is composed of a range of textual genres, including narratives and free conversations about topics such as experiences of being deaf or discussions about well-known individuals. All videos from the public corpus are available for download, accompanied by ELAN files containing data annotations. These annotations include glosses of the signs in English and German, separately for the right hand and left hand for each of the signers in the dyad, as well as translations (roughly on an utterance level) into English and German.

4.2 Data selection for the analysis

Data analyses were carried out through comprehensive searches in ELAN (version 6.6 2023) and the corpus website. For the initial analysis, all the ELAN files in the corpus were downloaded, and a structured multiple search was performed within the software to identify instances of PAM (which is glossed in the corpus as ON-PERSON1), yielding 669 occurrences in the corpus. All occurrences were checked by members of the research team, including two native DGS signers. This resulted in the identification of erroneous glossing of ON-PERSON1 in the corpus, based primarily on native signer intuition. These signs were reclassified as being (a version of the sign) PERSON, pronominal pointing signs (INDEX), or other phonologically similar, but unrelated signs (e.g., the verb SAY) (n = 233; see de Souza Santos et al. 2025). The erroneous glossing can be attributed to similar formational properties between these different sign types, with coarticulation effects obscuring phonetic distinctions, and a need for additional research, as in the case of PERSON.[1] Going the other way, and for similar reasons of phonological similarity, we identified (mainly by chance) additional occurrences of PAM that were annotated as other signs (e.g., INDEX) in the corpus (n = 14). A total of 450 occurrences of PAM were included in the final analysis.

4.3 Data coding

4.3.1 Sign order

We coded the order of constituents in all clauses in which PAM occurred, taking into account the position of the verb, its core arguments, and PAM. We did not annotate temporal or locative adverbials or additional adjuncts. In contexts where PAM appeared connected to a subordinate clause, we considered only the subordinate clause. We coded arguments of clauses with two core arguments as A1 and A2, coding the argument associated with the final location of PAM as A2 and the other argument as A1. In clauses with three core arguments, the other non-PAM-marked object argument was coded as A3. Complement clauses of verbs of saying and telling were also coded as A3. We have noted earlier (in Section 2.1) the difficulty of attributing grammatical relations and do not assume stable mappings between grammatical relations and semantic roles. Given the default assumption of subject-first constituent order for DGS and the association with PAM with the object, we assigned A1 and A2

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1 The analysis of the sign reclassified as PERSON is ongoing. We assume this to be a second object-marking sign, grammaticalized (like PAM), but different from the nominal sign PERSON. Steinbach (2022) describes the existence, but not use, of an indexical sign glossed as $PERSON_x$. Whether the signs identified as being PERSON in the corpus correspond to $PERSON_x$ also remains to be determined.
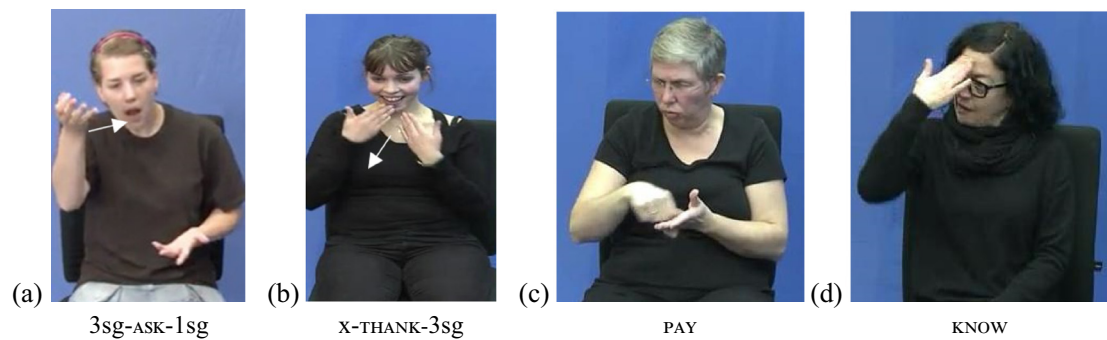
Figure 2: Example of DGS verbs coded as (a) BOTH: verbs that can move to indicate both subject and object arguments, as with ASK (dgscorpus_nue_08 | 18-30f); (b) AWAY: verbs that move from a fixed initial location on the body to indicate (non-first) object arguments, as with THANK (dgscorpus_koe_01 | 18-30f); (c) NEUTRAL-PLAIN: verbs produced in neutral space that can be modified to agree with one argument, as with BREAK (dgscorpus_koe_02 | 46-60f); and (d) BODY-PLAIN: verbs that cannot be moved through or localized in space, as with LOVE (dgscorpus_koe_16 | 46-60f).[4]

codes, respectively, for these arguments. In terms of semantic roles, A1 was typically the agent or experiencer of the verb, and A2 was the patient or recipient.[2] In cases where A1 or A2 was repeated, we annotated only the first realization of the argument. After annotating all possible orders with combinations of A1, A2, A3, V, and PAM, we coded whether A1 occurred first or non-first, whether PAM appeared preverbally or postverbally, and whether PAM was adjacent or not to the verb. We also coded for clause-internal and clause-final patterns of the use of PAM as defined by Bross (2020).[3]

4.3.2 Verb type and modification

We first coded all verbs occurring in clauses with PAM based on their ability to move through space to indicate arguments. Verbs that can move to indicate both subject and object arguments were coded as BOTH (e.g., the DGS signs ASK, GIVE; Figure 2a). Verbs that have a fixed initial location on the body and can be spatially modified only to indicate (non-first) object arguments were coded as AWAY (e.g., the DGS signs THANK, SAY; Figure 2b). Verbs that are executed in neutral space, but whose location can be modified to agree with one argument, either the subject or the object, were coded as NEUTRAL-PLAIN (e.g., the DGS signs PAY, BREAK; Figure 2c). Body-anchored verbs that cannot be moved through or localized in space were coded as BODY-PLAIN (e.g., the DGS sign KNOW, LOVE; Figure 2d). Clauses with non-lexical, constructed action or predicates from the productive lexicon, including classifier predicates (Brentari and Padden 2001), were coded as PRODUCTIVE (Figure 3a), while single-sign predicates that represent quoted content were coded as QUOTATION (Figure 3b). Finally, we coded as NO-VERB clauses that did not have an explicit verb sign associated with PAM (Figure 3c). This includes

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2 De Souza Santos et al. (2025) provide an example of an experiencer-object construction in DGS, with the verb glossed as EXHAUSTING1 (Public DGS Corpus) (see Frederiksen and Mayberry 2021 for a description of experiencer-object constructions in ASL).
3 Bross (2020) notes that PAM was used in his data in both clause-internal (i.e., A1-PAM-A2-V or A1-V-PAM-A2) and clause-final (i.e., A1-A2-V-PAM) patterns. Citing a marked preference for the use of clause-internal patterns, he points to the fact that claims regarding the function of PAM as an agreement marker have been made primarily for a clause-final pattern and leaves open the possibility of dialectal variation concerning the status as an agreement marker vs a differential object marker. Steinbach (2022), in contrast, makes a distinction between preverbal PAM$_x$ (differential object marker) and postverbal $_x$PAM$_y$ (agreement marker). This distinction between preverbal and postverbal does not, however, neatly map on to the distinction between clause-internal and clause-final patterns, as clause-internal PAM may appear postverbally (as shown in the A1-V-PAM-A2 order). Steinbach's (2022) discussion of Bross's (2020), in fact, seems to equate clause-internal with preverbal PAM, overlooking the postverbal clause-internal pattern that Bross describes.
4 All DGS examples in the manuscript are extracted from the Public DGS Corpus (Konrad et al. 2020). Examples are accompanied by a label in the form 'dgscorpus_[city]_[dyad] | [age group][gender]' that links directly to the corpus. For some examples, for purposes of illustration, glosses used in the manuscript deviate from glosses used in the corpus.
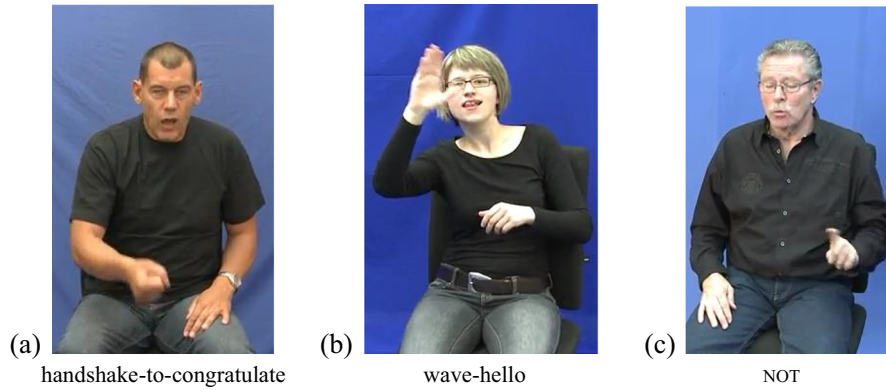
(a) handshake-to-congratulate   (b) wave-hello   (c) NOT

Figure 3: Example of predicates coded as: (a) PRODUCTIVE: verbs that are not in the established lexicon (dgscorpus_mue_13 | 46-60m); (b) QUOTATION: single-sign predicates that represent quoted content (dgscorpus_goe_07 | 18-30f); (c) NO-VERB: for clauses with no explicit verb sign (dgscorpus_koe_13 || 61+m). In the example in (c), PAM appears before the manual sign NOT and is accompanied by the mouthed verb *verlassen* (to leave someone) in a context meaning 'I do not leave her (alone)'.

INDEX-2sg   MUST   READ   PAM-1sg

"(They said) to me 'You have to read a lot'."

Figure 4: Example of quotation (constructed dialogue) as a complement argument of a verb of saying/telling, but without an explicit verb sign (dgscorpus_mst_10 | 46-60f).

utterances with larger quotations (or constructed dialogue), coded as A3 (Section 4.3.1), when no verb was mentioned (Figure 4).

For the verb types that could be modified to indicate arguments (i.e., BOTH, AWAY, NEUTRAL-PLAIN), we then coded whether they were in fact modified, and if so, how. We followed the coding scheme proposed in Fenlon et al. (2018). Verbs that were spatially modified for the object/patient or for both subject/agent and object/patient arguments were coded as 'modified'. This was based on the use of locations in space that were associated with subject and/or object referents. Verbs that were not spatially modified in accordance with referent–location associations were coded as 'unmodified'. The 'congruent' label was used to mark cases where the realization of the verb looked the same as the citation form of the sign, such that it was not possible to interpret the verb form as being clearly modified or not.

4.3.3 PAM modification

We coded the spatial modification of PAM similarly to our coding of verb modification described earlier, following Fenlon et al. (2018). We coded PAM as 'modified' when it was spatially modified, based on the use
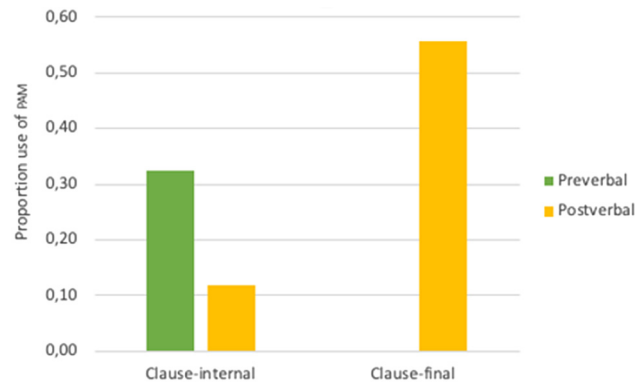
Figure 5: Proportion of clauses with PAM occurring preverbally or postverbally.

of locations associated with referents, to indicate the object argument, or both subject and object arguments (as predicted for an analysis of PAM as an agreement marker). Occurrences of PAM were coded as 'unmodified' when its movement did not correspond to referent locations associated with arguments. The label 'congruent' was used for cases in which PAM looked like its citation form (i.e., movement away from the body; Figure 1) and for which it was not possible to clearly interpret the form as being modified to indicate arguments. We also coded the modification of PAM for person. We coded for modification from first to non-first person, non-first to first person, and non-first to non-first person.

4.3.4 Argument realization

As noted earlier in our description of sign order coding, we coded the agent or experiencer (typically subject) argument of the verb as A1, the patient or recipient (PAM-marked object) argument as A2, and the second object argument of ditransitive verbs as A3. We coded occurrences of core arguments as overt if they were realized with either a nominal or pronominal (i.e., INDEX) sign, or with a combination of a nominal and pronominal (e.g., WOMAN INDEX).[5]

5 Results

5.1 PAM and constituent order

With respect to the use of PAM and constituent order, we are particularly interested in the relationship between PAM and the verb. Accordingly, we determined whether PAM occurred preverbally or postverbally. We were also interested in understanding the relationship between preverbal and postverbal occurrences and clause-internal and clause-final patterns (as described by Bross 2020), as these categories do not overlap (footnote 3). In Figure 5, we see that the majority of occurrences of PAM are postverbal (67% in total; n = 295), comprised of all clause-final orders (56%; n = 243) and about one-quarter (12%; n = 52) of clause-internal orders. The remaining clause-internal orders (33%; n = 142) make up the proportion of preverbal PAM occurrences.

Because Bross (2020) notes that the dominant pattern in his data elicitation with signers from the south of Germany is clause-internal, interpreted by Steinbach (2022) as corresponding to a dominant preverbal pattern, it is interesting to compare the distribution of preverbal vs postverbal as well as clause-internal and clause-

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5 Note that we did not count the use of PAM itself as an overt realization of the object argument. We address the syntactic function of PAM in the discussion.
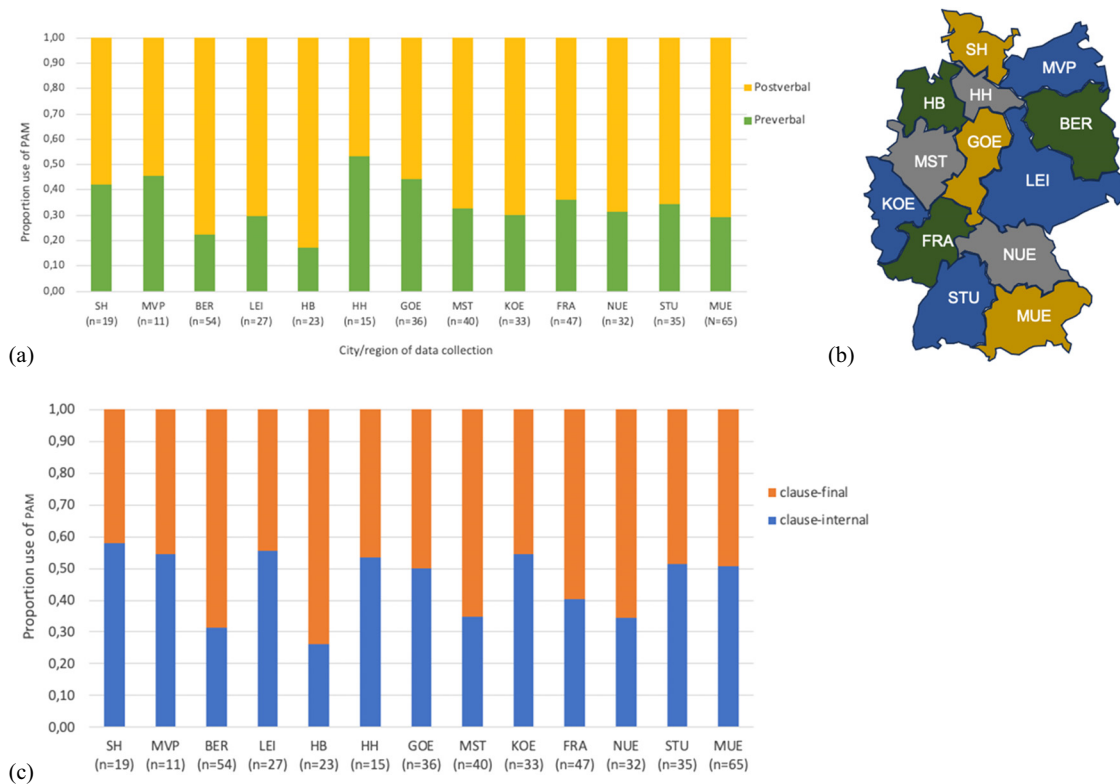
Figure 6: Distribution of preverbal and postverbal (in a) and clause-internal and clause-final (in c) occurrence of PAM in 13 different regions of data collection across Germany, showing the acronym and the total number of occurrences of PAM for each city/region and (in b) the location of each city/region within Germany. Key to the city/region acronyms: SH = Schleswig-Holstein; MVP = Mecklenburg-Vorpommern (city: Rostock); BER = Berlin; LEI = Leipzig; HB = (Hanseatic) Bremen; HH = (Hanseatic) Hamburg; GOE = Göttingen; MST = Münster; KOE = Köln (Cologne); FRA = Frankfurt; NUE = Nürnberg (Nuremberg); STU = Stuttgart; MUE = München (Munich).

final occurrences of PAM across the different regions of data collection in the DGS corpus project (Figure 6). The difference between preverbal and postverbal PAM does not seem to differ for regions in the south of Germany compared to other parts of Germany; certainly, the proportion of preverbal placement of PAM is not higher in the southern areas of DGS corpus data collection. When we group cities into the major regions of North (SH, HB, HH), East (MVP, BER, LEI), West (GOE, MST, KOE, FRA), and South (NUE, STU, MUE) (following Macht 2016), we see a relatively even distribution of preverbal and postverbal occurrences of PAM, as shown in Table 1. The use of preverbal PAM, however, seems somewhat lower in the eastern regions of Berlin (BER) and Leipzig (LEI), but also in Bremen (HB), and comparatively high in Hamburg (HH). Note that this differs from findings by Macht (2016), whose analysis of DGS corpus data revealed a higher proportion of use of preverbal PAM in the south of Germany (see also the summary in Steinbach 2022). When we look at the distribution of clause-final and clause-internal PAM, we see that both structures are equally favored in the southern regions of STU (Stuttgart) and MUE (Munich), which correspond most closely to signer origin in the data analyzed by Bross

Table 1: Preverbal and postverbal placement of PAM grouped by the four major geographical regions North, East, West, and South

Region	% Preverbal PAM	% Postverbal PAM
North (SH, HB, HH)	35% (*n* = 20)	65% (*n* = 37)
East (MVP, BER, LEI)	27% (*n* = 25)	73% (*n* = 67)
West (GOE, MST, KOE, FRA)	36% (*n* = 56)	64% (*n* = 100)
South (NUE, STU, MUE)	31% (*n* = 41)	69% (*n* = 91)

(2020). This does not differ substantially from most other regions in Germany; however, the clause-final pattern seems more strongly favored in some regions, e.g., BER (Berlin) and LEI (Leipzig).

We also looked at whether PAM occurs adjacent to the verb or not. In both preverbal and postverbal positions, PAM placement is predominantly immediately adjacent to the verb, i.e., right before or right after the verb, with only a small proportion occurring with intervening material (6% preverbal, $n = 25$; 3% postverbal, $n = 14$). Looking at PAM and A2, taking into consideration only clauses with overt realization of A2 ($n = 112$), we also predominantly find adjacency between PAM and A2 (78%, $n = 87$). In more than half of these cases (62%; $n = 54$), PAM is also adjacent to V. This is nearly always a V-PAM-A2 order, i.e., the postverbal, clause-internal (not clause-final) pattern, which makes up one-third of occurrences, as noted earlier. Finally, we looked at the position of A1 and whether A1 appeared in first or non-first position in each clause. The first thing to note is that close to half of all clauses did not have an overt A1 (43%; $n = 199$). When it was overt, A1 occurred in first position in the vast majority of cases (92%; $n = 243$). In only very few cases was A2 in first position, by means of either an overt nominal or a pronominal INDEX form (3%; $n = 13$). There were, however, a considerable number of cases in which A2 was associated with first position by virtue of object marking with PAM, i.e., where PAM itself appeared in first position (16%; $n = 75$). We discuss argument omission again in Section 5.3.

5.2 PAM and verb modification

In this subsection, we first present the distribution of different verb types that were coded (Figure 7). We see that body-anchored plain verbs (BODY-PLAIN), which cannot move through space to indicate arguments, represent the largest proportion of verbs (42%; $n = 192$). A similar proportion is represented by verbs that can move through or be located in space to indicate (or agree with) at least one of their arguments (i.e., BOTH, AWAY, and NEUTRAL-PLAIN verbs; 43%, $n = 195$). Of these, 19% represent verbs that can be spatially modified for both subject and object arguments (BOTH), while 9% represent verbs that allow movement only away from the body and whose movement can thus indicate only the object argument (AWAY). Verbs with no movement, but whose execution at a location in space can indicate (or agree with) an argument – either subject or object, but more typically the object – represent 15% of occurrences (NEUTRAL-PLAIN). The remaining verb types comprise the final 15% of clauses with PAM (QUOTATION: 4%, $n = 20$; PRODUCTIVE: 6%, $n = 30$; NO-VERB: 5%, $n = 25$).

When we look at the use of PAM together with verbs that can be modified for arguments, we see that these verbs do also get modified in contexts of occurrence with PAM. For BOTH verbs, which can be modified for both subject and object arguments, we find modification for both A1 and A2 arguments in about one-third of cases. In another one-third of cases, the verb form was coded as congruent with its citation form, such that it is
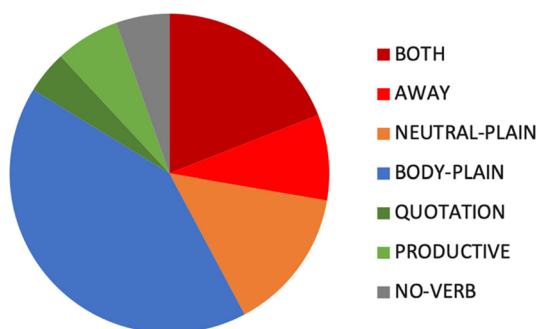

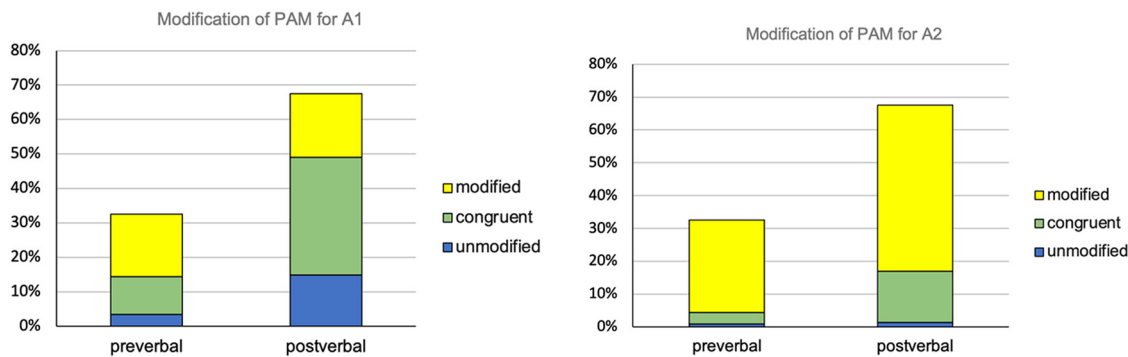**Figure 7:** Distribution of verb types across clauses with PAM.

Figure 8: Modification behavior of PAM for A1 and A2 arguments by preverbal and postverbal occurrence.

difficult to say whether there is modification or not. For verbs that agree only with the object (AWAY verbs), there was a similar occurrence of clear modification for A2 in about one-third of cases.

We now turn to the spatial modification behavior of PAM itself. Of particular interest here is any differential modification behavior of PAM in preverbal or postverbal placement. In Figure 8, we see the proportion of modification of preverbal and postverbal PAM for A1 and A2 arguments. Unsurprisingly, we see modification for A2 in the majority of cases for both preverbal and postverbal PAM. For cases labeled as congruent, there is no independent spatial evidence for the spatial modification of the sign to indicate its arguments. If we collapse congruent with modified, however as also done by (Fenlon et al. 2018), there are only very few cases in which PAM is not spatially inflected (i.e., unmodified). For the A1 argument, the picture is slightly different. Here, we see comparatively more cases of unmodified PAM in postverbal position. For A1, occurrences of PAM coded as congruent are more frequent; clear modification for A1 is more difficult to determine, especially for first-to-non-first arguments. If we consider the predominance of PAM modification for A2, it is interesting to look specifically at the modification behavior for A1 in these cases and the relationship to preverbal and postverbal occurrence of PAM, as shown in Table 2. When PAM occurs preverbally (and is modified for A2), A1 is more likely to be modified (64%; $n = 79$).

When we look at the distribution of arguments in terms of person for A1 and A2 across clauses with PAM, the majority of clauses were either first-to-non-first person (39%; $n = 181$) or non-first-to-first person (41%; $n = 189$). The remaining clauses had non-first-to-non-first-person arguments (20%; $n = 92$). In terms of the modification of PAM for person, PAM was most likely to be modified in cases of non-first-to-first person. Here, PAM was modified for first-person A2 in all cases and for non-first-person A1 in 81% of cases ($n = 153$). For first-to-non-first clauses, PAM was clearly modified for non-first A2 in over half of cases (59%; $n = 106$) and only clearly unmodified in 3% ($n = 6$) cases; otherwise, the coding was congruent for A2 and always congruent for first-person A1. For non-first-to-non-first clauses, spatial modification of PAM for A2 was clearly apparent in a majority of cases (78%; $n = 72$) and only unmodified in very few cases (4%; $n = 4$); otherwise, it was congruent. For the non-first A1s here, however, PAM was substantially more likely to be unmodified (52%; $n = 48$), with only 27% clear modification ($n = 25$). An overview of these results is given in Table 3.

Table 2: Modification behavior of PAM for A1 and A2 arguments by preverbal and postverbal occurrence for cases of A2 modification (total $N = 344$)

A1 PAM modification	A2 PAM modification	Preverbal PAM	Postverbal PAM
Modified	Modified	64% ($n = 79$)	36% ($n = 79$)
Congruent	Modified	24% ($n = 29$)	39% ($n = 87$)
Unmodified	Modified	12% ($n = 15$)	25% ($n = 55$)
		100% ($n = 123$)	100% ($n = 221$)

Table 3: PAM modification for A1 and A2 arguments based on person (first and non-first)

Person	A1			A2		
	Modified	Congruent	Unmodified	Modified	Congruent	Unmodified
First to non-first	0 (0%)	181 (100%)	0 (0%)	106 (59%)	69 (38%)	6 (3%)
Non-first to first	153 (81%)	0 (0%)	36 (19%)	189 (100%)	0 (0%)	0 (0%)
Non-first to non-first	25 (27%)	19 (21%)	48 (52%)	72 (78%)	16 (17%)	4 (4%)

5.3 PAM and argument omission

In this subsection, we look at the omission of arguments in clauses in which PAM occurred. Due in part to the prevalence of argument omission, there were a total of 29 different sign orders in the data. A very large proportion of utterances with PAM occur without overt encoding of A2 with a nominal and/or pronominal INDEX (77%; *N* = 346). Depending on the analysis of PAM, it may itself count as an overt realization of A2. We return to this point in the discussion. The most frequently represented clause type was A1 V PAM, with overt encoding of A1 and A2 marking only with PAM (*N* = 112; 25%). Equally frequent was a clause consisting only of V PAM, with omission of both A1 and A2 (*N* = 110; 24%).

6 Discussion

The results regarding the order of signs demonstrate that PAM is more likely to occur postverbally than preverbally, with about two-thirds postverbal occurrence. Comparing across cities and major regions of data collection across Germany, the predominance of postverbal PAM was quite consistent overall, although there might be a slight tendency for more preverbal use in eastern regions (especially Berlin and Leipzig), but not in southern regions, contrary to previous reports (Bross 2020, Steinbach 2022). It may be that differences in methodology – translation-based elicitation (in Bross 2020) vs corpus-based data – play a role here. The analysis by Macht (2016), however, showing more preverbal occurrence of PAM in the southern regions of Germany, is also based on DGS corpus data, but represents a subset of the data analyzed in the current study.[6] Looking also at the distribution of PAM in clause-final vs clause-internal position, we found that just over half of all PAM occurrences are in clause-final position. Postverbal and clause-final thus overlap most, but not all of the time. In both preverbal and postverbal orders, PAM is very likely to be adjacent to the verb, i.e., directly after or directly before the verb. PAM is also likely to occur adjacent to A2, with PAM occurring between A2 and the V, i.e., adjacent to both, about half the time. The predominant order in this case is V-PAM-A2, a postverbal, clause-internal pattern.

    We investigated these three parameters (post-/preverbal; adjacent/non-adjacent; clause-internal/-final) due to the non-overlapping definitions in the literature. Bross (2020) describes a clause-final pattern and two clause-internal patterns. The clause-final order (A1-A2-V-PAM) and one of the clause-internal orders (A1-V-PAM-A2) are postverbal, with the verb and PAM directly adjacent. In the other clause-internal order (A1-PAM-A2-V), PAM is in preverbal position, with A2 intervening between PAM and the verb (i.e., non-adjacent). Bross (2020) assumes both the clause-final and clause-internal patterns to exemplify PAM as a differential object marker and notes that the majority of DGS signers with whom he consulted preferred a clause-internal structure for PAM. He does not specify, however, whether signers showed a preference for one (postverbal PAM) or the other (preverbal PAM) of the clause-internal orders. Steinbach (2022) summarizes findings about the behavior of PAM (including Bross 2020, but also Murmann 2012, Macht 2016, Oomen 2021, Proske 2022) and puts forward the

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6 In addition, the signs that we excluded from analysis as potentially representing a separate differential object-marking sign (a version of the sign PERSON) would not have been excluded by Macht (2016) and may not show the same distributional properties as PAM.

proposal that there are two versions of PAM: a postverbal agreement marker $_x$PAM$_y$ and a preverbal differential object marker PAM$_x$. Steinbach (2022) describes the postverbal agreement marker as agreeing obligatorily with subject and object arguments (i.e., as obligatorily indicating subject and object arguments through spatial modification).

If Steinbach (2022) is right, then the majority of occurrences of PAM in the corpus are agreement markers that mark both subject and object arguments. To adjudicate here, it is necessary to look at the modification behavior of PAM. We see the modification of PAM for A2 in the majority of cases in both preverbal and postverbal positions. What is of most interest here is the modification behavior of PAM for A1, and in particular, in postverbal position. We should see A1 modification of PAM in postverbal position if the form in question here is what Steinbach (2022) describes as the $_x$PAM$_y$ agreement marker. This is not, however, what we see for A1. We see unmodified A1 predominantly in postverbal PAM and very little unmodified A1 in preverbal PAM. This goes against the assumption by Steinbach (2022) that postverbal PAM exhibits obligatory modification for (or agreement with) both A1 and A2, while preverbal PAM is modified for (or agrees with) only A2.

With respect to the modification of PAM in terms of person marking, the results showed that non-first-to-first-person modification made up 40% of occurrences of argument marking with PAM. In these cases, PAM reliably marked both first-person A2 (100% of the time) and non-first-person A1. Marking of first-person A2 was very clear. However, with respect to spatial marking of A1, from a non-first location in space, there is a potential confound from coarticulation. In many cases, the starting location of PAM is at the same location in space as the preceding sign, e.g., a sign for A1. It is not clear whether the modification of PAM for A1 in these cases is really a spatial modification or a phonetic coarticulation effect. The same issue is a confound for the non-first-to-non-first cases (20% of occurrences).

Finally, looking at the verb types that PAM occurs with, we see the majority of uses with plain body-anchored verbs that do not themselves move through space. The proportion of use of PAM with verbs that can move through or be located in space to indicate arguments (including neutral plain verbs) is equal in proportion to its use with body-anchored plain verbs. This suggests that PAM is not primarily fulfilling the function of marking arguments when the verb cannot and supports previous reports that PAM may occur with indicating (or agreement) verbs (as also noted by Steinbach and Pfau 2007; Rathmann 2003).

An important question concerns whether the patterns that we have described thus far are the result of marking with PAM. Do clauses without PAM exhibit similar or different patterns? To address this question, we compared our data with the data analyzed by Oomen (2021), also using the Public DGS Corpus.[7] The patterns look quite similar overall, but there are some interesting differences that suggest an interaction with PAM. The distribution of verb types overall is very similar to the distribution in clauses with PAM: Oomen (2021) reports 39% body-anchored plain verbs, compared to our 42%; 28% agreeing (comprised of agreeing and agreeing-spatial), compared to our 28% (comprised of BOTH and AWAY verbs); and 14% neutral plain verbs, compared to our 15%. To compare omission and position of arguments, we used the available data files in Oomen (2019). Here, we see that the proportion of non-overt A1 in our data (43%), focusing on clauses with PAM, is similar to the proportion of non-overt subject arguments (46%) reported in Oomen (2021). In contrast, the proportion of non-overt A2 arguments was comparatively higher in our data (75%), compared to non-overt object arguments (62%) in Oomen (2021). We can speculate that this is related to the presence of PAM, where A2 is not encoded with a (pro)nominal form, but is rather marked with PAM. Along these lines, it is interesting to note a different pattern in the proportion of occurrence of A2-first and PAM-first clauses: in the clauses with PAM analyzed here, we find a very low proportion of A2-first (4%), but a relatively high proportion of PAM-first (16%) clauses. The low proportion of A2 may seem surprising, given the possibility of topicalization in DGS (Happ and Vorköper 2006, Oomen 2021). Indeed, the corpus data analyzed by Oomen (2021) paint a different picture in this respect, reporting 13% (topicalized) object-first clause orders. The low occurrence of A2 in first position may be related to the presence of PAM in the clause.

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7 The analysis in Oomen (2021) is based on a total of "1,063 clauses containing 107 different DGS verb forms representing 58 verb meanings [from the ValPaL list (Hartmann et al. 2013)]" (p. 332).

The comparison with Oomen's (2021) data suggests some influence of PAM on other syntactic hierarchies. The high(er) proportion of clauses with PAM in first position suggests additional syntactic prominence marking (i.e., through constituent order). Similarly, the high proportion (75%) of marking with PAM occurring with a non-overt A2 argument suggests a doubling of prominence-marking operations: zero marking as a cue to discourse prominence and PAM marking as a cue to prominence based on semantic features of the referent (de Souza Santos et al. 2025). As argued in de Souza Santos et al. (2025), the use of PAM is primarily semantically determined (i.e., through agent-like properties of the object) and can be described in terms of prominence.

A prominence-based account of argument marking provides support for the behavior of PAM as a differential object marker. As de Souza Santos et al. (2025) report (see also the summary in Section 2), PAM occurs almost exclusively with highly individuated (i.e., human, definite) objects. Moreover, PAM occurs to give prominence to a stimulus object in an Experiencer-Stimulus frame, where the object is the initiator of a change in the state – in terms of mental/emotional experience – of a (non-volitional) experiencer subject (e.g., the verb *love*). Albeit less often, PAM also occurs in more typical Agent-Stimulus frames, where the subject is volitional and agentive, but the event is still initiated by the object to an important extent (e.g., the verb *wait*). The current findings provide additional evidence for the role of prominence in the behavior of PAM through the investigation of the interaction of PAM with other syntactic phenomena sensitive to prominence relations. Following standard accounts, we take sentence-initial position to be privileged in terms of prominence (e.g., Comrie 1989). We also take verb modification to be indicative of prominence relations, as described by Fenlon et al. (2018) for BSL. Fenlon et al. (2018) found that indicating (agreement) verbs were more likely to be modified to indicate the patient argument for animate compared to inanimate referents. On accessibility and givenness accounts, the more marking material is needed for a referent, the less accessible the referent is taken to be (e.g., Ariel 1990). If we equate accessibility with prominence, non-overt arguments would be particularly prominent. However, on the assumption that prominence markers bring active attention to a referent (or other type of element) competing for prominence (Himmelmann and Primus 2015), the overt realization of A2 may be an additional cue to prominence. Taking these different syntactic phenomena into account, we find that although it is possible for signals of prominence to accumulate, PAM marking of A2 typically occurs as the only syntactic marker of prominence, i.e., we find PAM most often when A1 is in first position and when verbs cannot themselves do the work of indicating arguments (in particular, body-anchored plain verbs). This evokes standard accounts of the use of PAM as an agreement auxiliary, filling the 'agreement gap' with verbs that cannot move through space (Steinbach and Pfau 2007). However, PAM occurs to an equally substantial degree with verbs that can indicate their arguments spatially, either through movement or through placement. We find that the use of PAM occurs together with verb modification in about one-third of cases, essentially doubling up on argument marking (also reported by Proske 2022, Steinbach 2022). The use of PAM with indicating (or agreement) verbs has been noted in accounts of PAM as an agreement auxiliary, with, e.g., a pragmatic function of emphasis (Steinbach and Pfau 2007). The high proportion of PAM use with verbs that move through space, however, points to a non-auxiliary function of PAM and calls for a more systematic investigation of the notion of emphasis. In terms of prominence, the use of PAM together with verb modification is a doubling up on prominence markers. Compared to single marking with PAM, double marking of prominence (with PAM and verb modification to mark the object) is used comparatively infrequently (in about 30% of cases of 20% of all verbs). These results align with the assumption that active attention does not need to be marked by different kinds of additional information. In this case, verb inflection for the object as a prominence marker does not happen as frequently in sentences with PAM because PAM is itself a marker of syntactic prominence that also serves the grammatical function of argument marking.

With respect to the competition for syntactic prominence between A1 and A2, we see that the use of PAM marks object prominence without the need for movement of A1 to a less prominent syntactic position. A1 was realized in initial position in over half of all cases (with the other nearly half of cases being instances of non-overt A1). By contrast, overt realization of A2 (separately from PAM) in initial position occurred only very rarely. Drawing active attention to the object referent to attribute prominence seems to rely primarily on the use of PAM as a single marker, or additional piece of morphosyntactic machinery. In some cases (16%), both with and without additional overt realization of A2, PAM appeared in initial syntactic position. The reasons for the prominence-marking element itself to assume prominent initial position are left for further research.

The status of PAM in terms of its syntactic category has also been a matter of debate. Bross (2020) describes PAM as a preposition-like element based on the fact that it does not disappear in a nominalization. In all examples for the use of PAM given by Bross (2020), the A2 argument is overt. If PAM is indeed a preposition-like element (that functions as a differential object marker), we would not expect it to occur without an overt realization of A2. We see the use of PAM without further overt marking of A2, however, in over three-quarters of cases. The use of PAM alone to mark A2 would be consistent with a pronominal account. Indeed, Meir (2003) describes an object-marking sign in Israeli Sign Language (ISL) that looks very similar to PAM, shares a grammaticalization from the noun sign PERSON, and shows remarkable distributional similarities to PAM in terms of nominal and verbal semantic features (as described in de Souza Santos et al. 2025). A similar sign is also described by Börstell (2017, 2019) for Swedish Sign Language (SSL) as a differential object marker. Both the ISL and SSL signs are analyzed as pronouns, with Börstell (2017) explicitly saying that the object marker replaces the entire noun phrase and Meir (2003) noting a paradigmatic relationship with the pronominal INDEX form. Although the distributional similarity with ISL, and given the historical relationship between DGS and ISL (Meir and Sandler 2008), makes a pronominal account of PAM attractive, the occurrence of PAM with (pro-)nominally overt A2 arguments makes the account morphosyntactically more difficult to defend. On an analysis of PAM as a pronoun, the omission of further identifying material for A2 would be expected. As discussed earlier, we also cannot uphold an analysis of PAM as an (agreement) auxiliary, given the high proportion of occurrence of PAM with indicating verbs, which suggests that PAM is not primarily motivated by the morpho-phonological properties of the verb it occurs with. Steinbach (2022) does not commit to an analysis, but specifies that the preverbal differential object marker PAM_x is a nominal marker in the domain of PP or DP, in contrast to the postverbal agreement marker $_xPAM_y$ in the verbal domain, but with both having grammaticalized from PERSON via determiner-like (indexical) elements (van Gelderen 2011). The observed morphosyntactic behavior of PAM is not, however, compatible with this account: we see less (instead of obligatory) modification of A1 with postverbal PAM, and we see more modification of A1 (instead of none) with preverbal PAM. Thus, we do not follow Steinbach (2022) in the claim that there are two agreement marker versions of PAM: one obligatorily marking the subject and object ($_xPAM_y$) and a differential object marker (PAM_x).

Cross-linguistically, however, there is a significant amount of variation in the syntactic behavior of adpositions, pronouns, and auxiliaries. Adpositions can sometimes occur without overt complements when the referent is recoverable from the context, as seen in English ('I'm inside') or German ('Ich bin draußen' – 'I am outside'), although such omissions are mainly attested in intransitive or locative contexts. Similarly, pronouns can sometimes appear together with overt noun phrases, as in Portuguese ('nós estudantes') or German ('wir Lehrer'), and exceptional constructions like Icelandic Pro[NP] structures (Sigurðsson and Wood 2020) demonstrate that pronouns can enter into complex relations with overt noun phrases under specific syntactic configurations. Furthermore, extended exponence – the realization of a single syntactic feature by multiple morphological exponents – is attested in languages like Lavukaleve (Hamann 2010), providing evidence that multiple overt markers for the same argument are possible under certain grammatical conditions. Therefore, while the evidence presented here suggests that PAM does not straightforwardly fit into the categories of preposition, pronoun, or auxiliary, further research is needed to systematically investigate its syntactic behavior, distribution, and potential historical developments.

What can we say then with respect to PAM? There are two main things to account for: the fact that PAM sometimes also marks the subject argument and the fact that marking of arguments is not obligatory. The first fact is difficult to account for on an analysis specifically as a differential object marker, and the second is difficult on an analysis as an agreement marker, in general. We suggest that an analysis in terms of differential indexing may be the most appropriate. As Haig (2018) notes, differential indexing depends on pragmatic and semantic factors, and he specifically reserves the term 'agreement' for marking that is obligatory. As Just (2024, 296) stresses, "indexing, contrary to agreement, does not presuppose any syntactic relationship between the marker and the referential noun phrase, nor whether the latter is obligatorily expressed." While differential object indexing has been more widely studied, differential subject indexing also exists, although seems to be more restricted cross-linguistically than differential object indexing (Haig 2018). Because we see the primary motivation for the use of PAM best described in terms of (nominal and verbal) semantic properties (de Souza Santos et al. 2025), we see potential in an analysis assuming differential argument indexing. PAM may be able to

differentially mark the subject, based also on semantic features, in addition to differential marking of the object. We expect the relevant semantic features triggering marking of the subject (together with the object) to be explainable with respect to prominence relations. In fact, when we look at the semantic properties of A1 arguments marked with PAM, we see that the vast majority (nearly 90%) are animate referents and that unmodified A1 arguments are more likely to be inanimate referents. The simultaneous differential marking of both arguments in a single form is typologically unexpected, but may be a modality-specific property of argument indexing. Differential argument indexing has been described primarily in terms of reference-tracking functions (Iemmolo 2011, Just 2024). We see this as compatible with a prominence-based account, tracking referents in terms of prominence as cued by semantic features and discourse properties.

7 Conclusion

Overall, we have observed that, in sentences with PAM, the subject tends to be in the initial position and the object tends to be in a non-initial position. Moreover, the subject is overt in over half of cases, while the object is non-overt (besides its marking with PAM) in over three-quarters of cases. The modification of verbs toward the object occurs in only about one-third of cases. These observations regarding the behavior of other morphosyntactic phenomena in the context of PAM use leads us to draw the following conclusions with respect to prominence and PAM:

1. PAM is additional information of active attention that confers more prominence than the passive attention afforded to inherently prominent elements and behaviors in syntax (e.g., first position and subject);
2. It is not common for PAM to co-occur with other additional information bringing active attention (or prominence) to the object;
3. The accumulation of different markers of prominence on the object is not prohibited, however, as PAM can co-occur with other markers (e.g., verb modification to indicate the object);
4. We do not find clear evidence for two types of PAM, with a functional divide between agreement marking and differential object marking; instead, the behavior of PAM in the corpus points to a differential marking of both subject and object arguments. We propose an analysis in terms of differential argument indexing based on the primarily semantic motivation and non-obligatory nature of marking with PAM.

Further research is also needed to better understand the relationship between constituent order and verb modification in marking linguistic prominence, in particular through the comparison of clauses with and without PAM. The relatively infrequent occurrence of PAM in the corpus may be due to more frequent use of object marking, in the sense of bringing active attention to the object, through changes in constituent order and verb modification. These other contexts, i.e., of utterances without PAM, but with verb modification and constituent order alternations, need further investigation. In addition, further research is needed to explore the relationship between the marking of prominence in utterances employing constructed action (as depictions or quotations) and the relationship of PAM with constructed action. The interaction with prominence-lending semantic properties in the nominal (human, definite) and verbal (positive or negative affectedness of the object) domains brings about a reliance on PAM in these contexts, without the need or possibility for prominence marking in other ways.

Abbreviations

GLOSS	glosses for signs given in small capital letters
1sg/2sg/3sg	first/second/third person singular reference
GLOSS$_{3a}$	subscript indicates location associated with third person referent at location 3a
INDEX	index, i.e., pointing sign, with pronominal meaning

ᴘᴀᴍ	acronym stemming from Person Agreement Marker
goe	Göttingen
koe	Cologne (Köln)
mst	Münster
mue	Munich (München)
nue	Nuremberg (Nürnberg)
f	female
m	male
18–30	age group for signers aged 18–30 years old
46–60	age group for signers aged 46–60 years old
61+	age group for signers aged 61 years old

Links to the examples used from the Public DGS Corpus are given in the format 'dgscorpus_[CITY]_[DYAD NUMBER] | [AGE GROUP][GENDER]'.

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References

Aissen, Judith. 2003. "Differential Object Marking: Iconicity vs Economy." *Natural Language & Linguistic Theory* 21: 435–83. doi: 10.1023/A:1024109008573.

Ariel, Mira. 1990. *Accessing Noun-Phrase Antecedents*. London: Routledge.

Börstell, Carl. 2019. "Differential Object Marking in Sign Languages." *Glossa: a journal of general linguistics* 4 (1): 4.

Börstell, Carl. 2017. *Object Marking in the Signed Modality: verbal and Nominal Strategies in Swedish Sign Language and other Sign Languages*. PhD diss., Stockholm University.

Börstell, Carl. 2019. "Differential Object Marking in Sign Languages." *Glossa: a journal of general linguistics* 4 (1): 3. doi: 10.5334/gjgl.780.

Brentari, Diane and Carol Padden. 2001. "Native and Foreign Vocabulary in American Sign Language: A Lexicon with Multiple Origins." In *Foreign Vocabulary in Sign Languages: A Cross-Linguistic Investigation of Word Formation*, edited by Diane Brentari, 87–119. Mahwah, NJ: Lawrence Erlbaum Associates.

Bross, Fabian. 2018. *The clausal syntax* of German Sign Language. PhD diss., University of Stuttgart.

Bross, Fabian. 2020. "Object Marking in German Sign Language (*Deutsche Gebärdensprache*): Differential Object Marking and Object Shift in the Visual Modality." *Glossa: a journal of general linguistics* 5 (1): 63.

Bross, Fabian and 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. doi: 10.5334/gjgl.106.

Comrie, Bernard. 1989. *Language Universals and Linguistic Typology. Syntax and Morphology*. 2nd edn. Chicago: University of Chicago Press.

De Beuzeville, Louise, Trevor Johnston, and Adam C. Schembri. 2009. "The Use of Space with Indicating Verbs in Auslan: a Corpus-based Investigation." *Sign Language & Linguistics* 12 (1): 35–82. doi: 10.1075/sll.12.1.03deb.

De Souza Santos, Thiago, Antonia Dietrich, Peggy Steinbach, and Pamela Perniss. 2025. "Differential Object Marking in DGS (German Sign Language): A prominence-based account of the use of PAM based on naturalistic data." *Glossa: a journal of general linguistics* 10 (1). doi: 10.16995/glossa.11591.

ELAN (Version 6.6) [Computer software]. 2023. *Nijmegen: Max Planck Institute for Psycholinguistics, The Language Archive*. https://archive.mpi.nl/tla/elan.

Fenlon, Jordan, Adam Schembri, and Kearsy Cormier. 2018. "Modification of Indicating Verbs in British Sign Language: A Corpus-based Study." *Language* 94 (1): 84–118.

Frederiksen, Anne Therese and Rachel I. Mayberry. 2021. "Implicit Causality Biases and Thematic Roles in American Sign Language." *Behavior Research Methods* 53: 2172–90. doi: 10.3758/s13428-021-01561-1.

Glück, Susanne and Roland Pfau. 1998. "On Classifying Classification as a Class of Inflection in German Sign Language." In *ConSOLE VI Proceedings*, edited by Tina Cambier-Langeveld, Anikó Lipták, and Michael Redford, 59–74. Leiden: SOLE.

Haig, Geoffrey. 2018. "The Grammaticalization of Object Pronouns: Why Differential Object Indexing is an Attractor State." *Linguistics* 56 (4): 781–818. doi: 10.1515/ling-2018-0011.

Hall, Matthew L., Rachel I. Mayberry, and Victor S. Ferreira. 2013. "Cognitive Constraints on Constituent Order: Evidence from Elicited Pantomime." *Cognition* 129: 1–17. doi: 10.1016/j.cognition.2013.05.004.

Hamann, Jakob. 2010. "On the Syntax and Morphology of Double Agreement in Lavukaleve." In *2 in Agreement*, edited by Sebastian Bank, Doreen Georgi, and Jochen Tremmer, 197–225. Leipzig: Merkur Druck.

Happ, Daniela and Marc-Oliver Vorköper. 2006. *Deutsche Gebärdensprache: Ein Lehr- und Arbeitsbuch [German Sign Language: A study and work book]*. Frankfurt am Main: Fachhochschulverlag.

Hartmann, Iren, Martin Haspelmath, and Bradley Taylor (Eds.). 2013. *Valency Patterns Leipzig*. Max Planck Institute for Evolutionary Anthropology. https://valpal.info.

Himmelmann, Nikolaus P. and Beatrice Primus. 2015. "Prominence Beyond Prosody – A First Approximation." In *Prominences in Linguistics*, edited by A. De Dominicis, 38–58. Viterbo: DISUCOM Press.

Iemmolo, Giorgio. 2011. *Towards a Typological Study of Differential Object Marking and Differential Object Indexation*. PhD diss., University of Pavia.

Jantunen, Tommi. 2008. "Fixed and Free: Order of the Verbal Predicate and its Core Arguments in Declarative Transitive Clauses in Finnish Sign Language." *SKY Journal of Linguistics* 21: 83–123. http://www.linguistics.fi/julkaisut/SKY2008/Jantunen_NETTIVERSIO.pdf.

Johnston, Trevor A. 2019. "Clause Constituents, Arguments and the Question of Grammatical Relations in Auslan (Australian Sign Language): A Corpus-based Study." *Studies in Language* 43 (4): 941–96.

Just, Erika. 2024. "A Structural and Functional Comparison of Differential A and P Indexing." *Linguistics* 62 (2): 295–321. doi: 10.1515/ling-2021-0124.

Konrad, Reiner, Thomas Hanke, Gabriele Langer, D. Blanck, Julian Bleicken, I. Hofmann, O. Jeziorski, Lutz König, S. König, R. Nishio, A. Regen, U. Salden, S. Wagner, S. Worseck, O. Böse, Elena Jahn, and M. Marc Schulder. 2020. *MY DGS – Annotated. Public Corpus of German Sign Language*. doi: 10.25592/dgs.corpus-3.0.

Leeson, Lorraine and John Saeed. 2012. "Word Order." In *Sign Language: An International Handbook*, edited by Roland Pfau, Markus Steinbach, and Bencie Woll, 245–65. Berlin: De Gruyter.

Lillo-Martin, Diane. 1991. "Universal Grammar and American Sign Language: Setting the Null Argument Parameters." In *Studies in Theoretical Psycholinguistics*. Dordrecht: Kluwer. doi: 10.1007/978-94-011-3468-2_1.

Lillo-Martin, Diane and Richard P. Meier. 2011. "On the Linguistic Status of 'Agreement' in Sign Languages." *Theoretical Linguistics* 37 (3/4): 95–141. doi: 10.1515/thli.2011.009.

Macht, Claudia. 2016. *Distribution von PAM in der Deutschen Gebärdensprache. Eine korpusbasierte Untersuchung*. MA thesis, University of Hamburg.

Malchukov, Andrej. 2005. "Case Pattern Splits, Verb Types and Construction Competition." In *Competition and Variation in Natural Languages. The Case for Case*, edited by Mengistu Amberber and Helen de Hoop, 73–117. Oxford: Elsevier.

McKee, Rachel, Adam Schembri, David McKee, and Trevor Johnston. 2011. "Variable "Subject" Presence in Australian Sign Language and New Zealand Sign Language." *Language Variation and Change* 23: 375–98. doi: 10.1017/S0954394511000123.

Meir, Irit. 2003. "Grammaticalization and modality: the emergence of a case-marked pronoun in Israeli Sign Language." *Journal of Linguistics* 39(1): 109–40. doi: 10.1017/S0022226702001664.

Meir, Irit, Carol Padden, Mark Aronoff, and Wendy Sandler. 2007. "Body as Subject." *Journal of Linguistics* 43: 531–63. doi: 10.1017/S0022226707004768.

Meir, Irit and Wendy Sandler. 2008. *A Language in Space: The Story of Israeli Sign Language*. New York: Psychology Press. doi: 10.4324/9780203810118.

Murmann, Christina. 2012. *The Agreement Auxiliary PAM in German Sign Language: An Empirical Investigation*. MA thesis, University of Düsseldorf.

Napoli, Donna Jo and Rachel Sutton-Spence. 2014. "Order of the Major Constituents in Sign Languages: Implications for all Language." *Frontiers in Psychology* 5: 376. doi: 10.3389/fpsyg.2014.00376.

Napoli, Donna Jo, Rachel Sutton Spence, and Ronice Müller de Quadros. 2017. "Influence of Predicate Sense on Word Order in Sign Languages: Intensional and Extensional Verbs." *Language* 93 (3): 641–70.

Neidle, Carol Jan. 2000. *The Syntax of American Sign Language: Functional Categories and Hierarchical Structure*. Cambridge, MA: MIT Press.

Nevins, Andrew. 2011. "Prospects and Challenges for a Clitic Analysis of (A)SL Agreement." *Theoretical Linguistics* 37 (3/4): 173–87.

Oomen, Marloes. 2017. "Iconicity in Argument Structure. Psych-verbs in Sign Language of the Netherlands." *Sign Language & Linguistics* 20 (1): 55–108. doi: 10.1075/sll.20.1.03oom.

Oomen, Marloes. 2019. *Data Annotation Files*. University of Amsterdam/Amsterdam University of Applied Sciences. Dataset. doi: 10.21942/uva.9778556.

Oomen, Marloes. 2021. *Iconicity and Verb Agreement. A Corpus-Based Syntactic Analysis of German Sign Language*. Amsterdam: De Gruyter Mouton.

Oomen, Marloes and Vadim Kimmelman. 2019. "Body-anchored Verbs and Argument Omission in Two Sign Languages." *Glossa: a journal of general linguistics* 4 (1): 42. doi: 10.5334/gjgl.741.

Pfau, Roland, Martin Salzmann, and Markus Steinbach. 2018. "The Syntax of Sign Language Agreement: Common Ingredients, but Unusual Recipe." *Glossa: a journal of general linguistics* 3 (1): 107. doi: 10.5334/gjgl.511.

Primus, Beatrice. 2001. "Word Order Typology." In *Language Typology and Language Universals 2*, edited by Martin Haspelmath, Ekkehard König, Wulf Oesterreicher, and Wolfgang Raible, 855–74. Berlin: De Gruyter.

Proske, Sina. 2022. *The Impact of Verb Type on Word Order in German Sign Language*. PhD diss., University of Göttingen.

Rathmann, Christian. 2000. *The Optionality of Agreement Phrase: Evidence from Signed Languages*. MA thesis, University of Texas at Austin.

Rathmann, Christian. 2003. "The Optionality of Agreement Phrase: Evidence from German Sign Language (DGS)." *Texas Linguistics Forum* 53: 181–92.

Sapountzaki, Galini. 2012. "Agreement Auxiliaries." In *Sign Language. An International Handbook*, edited by Roland Pfau, Markus Steinbach, and Bencie Woll, 204–27. Berlin: De Gruyter.

Schembri, Adam, Kearsy Cormier, and Jordan Fenlon. 2018. "Indicating Verbs as Typologically Unique Constructions: Reconsidering Verb 'Agreement' in Sign Languages." *Glossa: a journal of general linguistics* 3 (1): 89. doi: 10.5334/gjgl.468.

Schouwstra, Marieke, Danielle Naegeli, and Simon Kirby. 2022. "Investigating Word Order Emergence: Constraints From Cognition and Communication." *Frontiers in Psychology* 13: 805144. doi: 10.3389/fpsyg.2022.805144.

Schulder, Marc, Dolly Blanck, Thomas Hanke, Ilona Hofmann, Sung-Eun Hong, Olga Jeziorski, Lutz König, Susanne König, Reiner Konrad, Gabriele Langer, Rie Nishio, and Christian Rathmann. 2024. *Data Statement for the Public DGS Corpus*. doi: 10.25592/uhhfdm.1745.

Sigurðsson, Halldór Ármann and Jim Wood. 2020. "We Olaf": Pro[(x-)NP] Constructions in Icelandic and Beyond." *Glossa: A Journal of General Linguistics* 5(1): 16. doi: 10.5334/gjgl.1054.

Steinbach, Markus. 2022. "Differential Object Marking in Sign Languages? Restrictions on (Object) Agreement in German Sign Language, 209–240." In *Angles of Object Agreement*, edited by Andrew Nevins, Anita Peti-Stantic, Mark de Vos, and Jana Willer-Gold. Oxford: Oxford University Press.

Steinbach, Markus and Roland Pfau. 2007. "Grammaticalization of Auxiliaries in Sign Languages." In *Visible Variation: Comparative Studies on Sign Language Structure*, edited by Pamela Perniss, Roland Pfau, and Markus Steinbach, 303–39. Berlin: De Gruyter Mouton.

Steinbach, Markus and Annika Herrmann. 2013. "Satztypen in Gebärdensprache [Sentence types in sign language]." In *Satztypen des Deutschen*, edited by Jörg Meibauer, Markus Steinbach, and Hans Altmann, 786–814. Berlin: De Gruyter.

Tomlin, Russell S. 1986. *Basic Word Order: Functional Principles*. London: Routledge.

Tsunoda, Tasaku. 1985. "Remarks on Transitivity." *Journal of Linguistics* 21 (2): 385–96.

van Gelderen, Elly. 2011. *The Linguistic Cycle: Language Change and the Language Faculty*. Oxford: Oxford University Press. doi: 10.1093/acprof:oso/9780199756056.001.0001.