Two agreement markers
in Austrian Sign Language (ÖGS)

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For many of the sign languages studied to date, different types of agreement markers have been described which express agreement in transitive constructions involving non-inflecting (plain) verbs and sometimes even inflected agreement verbs. Austrian Sign Language (ÖGS) belongs to the group of sign languages employing two different agreement markers (AGRM-BC/AGRM-MF), which will be described in this paper. In an online questionnaire, we focused on two questions: (i) whether both forms of agreement markers are rated as equally acceptable by Deaf ÖGS-signers and hearing native signers, and (ii) whether there is a preferred syntactic position (pre- vs. postverbal) for these markers. Data analysis confirmed that both agreement markers are accepted by ÖGS-signers and that both agreement markers are slightly preferred in preverbal position. Further, possible origins of both agreement markers are discussed.

Keywords: agreement, agreement markers, word order, Austrian Sign Language, questionnaire

1. Agreement in sign languages

In contrast to spoken languages, which may use word order and/or inflectional morphology (e.g. case marking) to indicate the grammatical role of arguments (subject/object), sign languages make use of the grammatical signing space for marking the argument structure. More specifically, signers reference discourse participants in space and adapt the path movement as well as the hand orientation of certain verbs – the so-called "agreement verbs" – to indicate subject/object agreement (Mathur & Rathmann 2012). However, across sign languages, another

class of verbs exists which does not mark agreement in this way for phonological reasons. In sentences involving such so-called "plain verbs", different sign languages employ different strategies to mark agreement, one of these strategies being the recruitment of manual agreement markers which have been described for a number of sign languages. Before addressing the characteristics of sign language agreement markers in Sections 1.4 and 2, the establishment of loci, the realization of verb agreement, and different verb types will be outlined in Sections 1.1–1.3.

1.1 Spatial establishment of arguments

In sign languages, verb agreement may be indicated by the use of the grammatical signing space, the three-dimensional space in front of the signer. A strategy commonly employed by signers is to first introduce the (definite or specific) participating discourse referents by the corresponding lexical signs. The discourse referents are then associated with locations in signing space by manual as well as nonmanual means. Thereby, persons, objects, or places may be referenced by manual pointing signs (indexical signs, glossed as ɪx 'index'), by nonmanual markers such as eye-gaze or body shift toward the index location, or a combination of these manual and nonmanual markers. In addition to the referencing strategy in which the index sign follows the nominal sign, the reversed order (index-nominal order) as well as the simultaneous realization of nominal and index sign have also been observed. Furthermore, a referent may also be indexed in space by articulating the referent sign at the specific location in signing space when possible. These reference points (see Figure 1), the so-called Referential or R-loci, either refer directly to referents who are physically present in the communication setting or to absent persons, places, or objects. Further, these R-loci can be used for subsequent reference to each referent, that is, signers may refer to arguments already established in context by pointing, nonmanual marking (e.g. eye-gaze, body shift), moving the referent sign in space, and modifying the beginning or end locations/facing of agreement verbs/agreement markers (discussed in the next section) (e.g. Fischer 1975; Padden 1983; Liddell 2003).
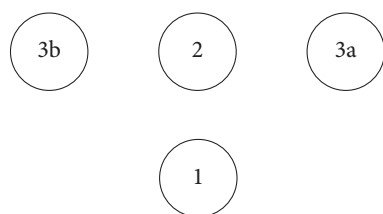
Figure 1. Referencing of arguments in signing space (1: first person; 2: second person; 3a: third person referenced to the right of the signer; 3b: third person referenced to the left of the signer)

1.2 Spatial agreement by movement and facing

After referencing the arguments in signing space, the beginning and endpoint of the path movement of the agreement verb indicate the argument structure, that is, the agreement verb moves from the subject to the object location (Fischer 1975; Padden 1983). An additional morphological feature of agreement verbs is that the hand and/or finger orientation, that is, the so-called "facing" of the hand, may express agreement with the object in that the palm and/or the fingertips are oriented towards the established location of the object (Brentari 1989; Meir 1998). In American Sign Language (ASL), some agreement verbs show path movement from the subject to the object location as well as facing towards the object, while others only involve path movement but no facing. Conversely, there are also ASL agreement verbs that are inflected only by facing, i.e. without path movement. Furthermore, a small set of agreement verbs, the so-called "backwards verbs", show a reversed path movement, namely from the object- to the subject-locus. Despite reversal of the path movement, facing towards the object may also be apparent in backwards verbs, just as in regular agreement verbs (Meir 1998, 2002).

Note that the use of the term "verb agreement" for describing the process of indicating argument structure within signing space is controversial (Rathmann & Mathur 2002; Mathur & Rathmann 2012; Lillo-Martin & Meier 2011). For example, the linguistic status of the spatial loci used for verbal agreement in sign languages is debated, that is, whether these loci should be considered as linguistic or rather be described as gestural (e.g. Liddell 2003). Further, it is still under debate whether sign language verb agreement is a purely syntactically determined process. Gökgöz (2013), for instance, shows that for describing at least object marking in ASL, a purely syntactic approach does not suffice. On the basis of intervention effects of different word orders, conditional clauses, and negation, he demonstrates that no c-command relation between the object and the verb (directional/agreement verb and verb with classifier handshape) is required. He therefore concludes that the process of "verb agreement" in sign languages cannot be equated with verb agreement as described for languages such as English or German. He points out that semantics as well as syntax play a role in the marking of argument structure in signed transitive sentences involving agreement verbs and verbs with classifier handshapes. However, although the process of verbal agreement in sign languages cannot be described in purely syntactic terms, and there are still ongoing discussions regarding the details of this process, its status as a grammatical process is widely accepted within sign language linguistics (see e.g. Wilbur (2013) for an overview). Nevertheless, keeping this controversy in mind, in the following the term "verb agreement" will be used to refer to the process of indicating argument structure by spatial means.

1.3   Verb typology in sign languages

As described above, agreement verbs are not the only verb type observed in sign language grammars. Padden (1983) was the first to distinguish three verb types based on their differing morphosyntactic characteristics. In addition to agreement verbs (which Padden originally referred to as "inflecting verbs"), she further described the categories of spatial and plain verbs. Like agreement verbs, spatial verbs are also directed towards locations in signing space, but they specify locative information (e.g. Janis 1992). For instance, the sign MOVE is a spatial verb in Austrian Sign Language (*Österreichische Gebärdensprache*, ÖGS), as it may express source and/or goal for someone/something who/which has (been) moved. Verbs belonging to the third category, plain verbs, do not show any inflection for subject and object. Although there are some plain verbs which (may) involve path movement, they differ from agreement verbs in that their path movement cannot be modified by incorporating R-loci. Interestingly, the majority of sign languages studied to date show this differentiation between agreement and plain verbs.[1,2]

In this paper, we will focus on the class of plain verbs and the different strategies a number of sign languages use to indicate agreement in sentences containing this type of verb. In ASL, for example, the argument relation in transitive structures involving plain verbs is indicated either by semantic restrictions or word order. Thus, the strict SVO-order avoids ambiguity with respect to which argument is subject in potentially reversible transitive ASL-structures with plain verbs, where by 'reversible' we mean that either argument could potentially be considered the subject (Friedman 1976). In addition, it has been claimed that specific nonmanual markers, such as eye-gaze towards the object position and head tilt towards the subject position, may indicate object and subject agreement, respectively, in sentences with all verb types, and therefore also with plain verbs (Bahan 1996; Neidle

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1. Note however, that this three-way classification is not always as straightforward as described. For example, some verbs can function either as an agreement or as a spatial verb depending on context. Recent accounts provide empirical evidence in favor of just distinguishing between agreeing and plain verbs (for a more detailed discussion, see e.g. Quadros 1999; Quadros & Quer 2008; Quer 2011).

2. For Israeli Sign Language (ISL), a relatively young sign language, Padden et al. (2010) observe that a consistent verb agreement system showing the threefold differentiation of verb classes developed within two or three generations. However, in another relatively young sign language, Nicaraguan Sign Language, a much faster genesis of grammaticalized space and agreement structures has been observed (see Senghas & Coppola 2001, 2011; Pfau 2011 – we thank Brendan Costello for pointing this out to us). Further, there are some sign languages such as Kata Kolok, a rural sign language from Bali, which do not show any form of spatial verb agreement (de Vos (2012) – we thank an anonymous reviewer for mentioning this point).

et al. 2000). However, based on the results from an eye-tracking study, Thompson et al. (2006) provide counter-evidence to this claim by showing that – at least in ASL – only agreement verbs are systematically accompanied (or even preceded) by eye-gaze towards the object position.

Moreover, some sign languages employ yet another strategy to mark agreement in transitive sentences with plain verbs. In particular, they have at least one manual sign co-occurring with the main verb which functions as an agreement marker, that is, a marker that spells out agreement features if the main verb cannot perform this function. Some sign language linguists consider this marker a type of auxiliary verb. In general, such agreement markers show the same path movement from the subject to the object position and/or facing as described for regularly inflected agreement verbs (to be qualified below) (e.g. Mathur & Rathmann 2012; Sapountzaki 2012).

Although agreement markers observed in sign languages and auxiliaries in spoken languages share a number of characteristics, Pfau & Steinbach (2006) point out three aspects in which these forms differ: First, spoken language auxiliaries normally indicate grammatical categories such as tense, aspect, and modality. Therefore, expressing agreement is not the main function of auxiliaries in spoken languages. In contrast, the main function of agreement markers in sign languages is to mark the subject and the object of a sentence – and this is why they are referred to as "agreement markers" or "agreement auxiliaries". Second, in contrast to spoken language auxiliaries, most of the sign language agreement markers described to date are restricted to select only animate arguments, just like agreement verbs do. Third, whereas auxiliaries in spoken languages usually grammaticalize from verbal sources, sign language agreement markers may evolve from verbs, pronouns, and also from nouns. Across sign languages, agreement markers differ in the lexical source they developed from, in phonological form, and in the syntactic position in which they appear, mostly pre- or postverbally.

In addition, sign language agreement markers show differences regarding their distributional properties, that is, with respect to which verbs they may combine with. More specifically, whereas in some sign languages, the agreement marker(s) can co-occur with plain verbs as well as (un)inflected agreement verbs, in others, a form of "double inflection", that is, the combination of an inflected agreement verb and an agreement marker within a clause, is not allowed. In addition, there are sign languages in which agreement markers may also accompany predicative adjectives (Steinbach & Pfau 2007; Sapountzaki 2012). As a specific example, the sign language agreement marker used in German Sign Language will be briefly described in the following section.

1.4 Person Agreement Marker (PAM) in German Sign Language

One of the sign languages which uses an agreement marker in constructions with plain verbs is German Sign Language (*Deutsche Gebärdensprache*, DGS). Because this agreement marker is highly similar phonologically to one of the agreement markers observed in ÖGS, it will be described briefly. DGS employs a single agreement marker, glossed as PAM (an abbreviation for *Person Agreement Marker*; Rathmann 2003). PAM has been derived from a noun, namely the noun PERSON,[3] which is produced with a Baby-C-handshape (index and thumb are forming a C-handshape) with a vertical downwards movement in front of the signer. Figure 2 illustrates the noun PERSON (left picture) and the marker PAM (right picture) (Pfau & Steinbach 2006: 32).
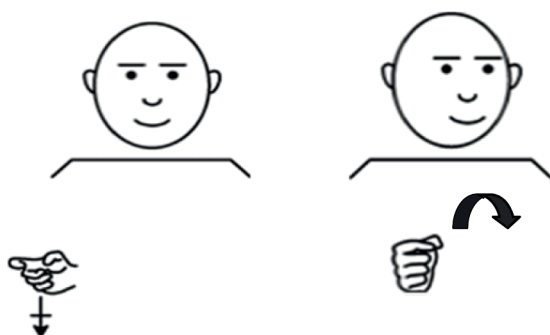

Figure 2. The noun PERSON (left picture) and the Person Agreement Marker (PAM) (right picture) (Pfau & Steinbach 2006: 32)

In contrast to the lexical sign PERSON, PAM moves from the subject to the object location and shows facing of the fingertips towards the object to indicate verb agreement. PAM occurs in constructions with animate arguments involving plain verbs, uninflected agreement verbs, verbs that cannot show agreement with non-first person subjects and first person objects for phonological reasons, as well as predicative adjectives. PAM may occur in postverbal position, but it can also appear preverbally (Steinbach 2011) and even before the object, as illustrated in (1) from Rathmann (2003: 182).[4] It has been suggested that the syntactic position of PAM may be subject to dialectal variation (Steinbach 2011).

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3. Thus, the gloss PAM refers to the phonological form of the agreement marker as well as to its morphosyntactic function.

4. Note that the basic sign order in DGS is SOV.

(1) HANS$_i$ $_i$**PAM**$_j$ MARIE$_j$ MAG
     Hans PAM Marie like
     'Hans likes Marie.'

Historically, PAM was often accompanied by the mouthing /auf/ ('on'). Interestingly, in the younger generation of signers, this mouthing tends to be dropped (Pfau & Steinbach 2006). According to Steinbach & Pfau (2007), the disappearance of the mouthing exemplifies phonological erosion and thus indicates that the agreement marker has grammaticalized to a greater extent.

Moreover, Steinbach (2011) notes that the mouthing associated with the verb sign may extend over postverbal PAM. In addition, there is a reduced form of PAM in which its path movement shows only agreement with the object, reflecting a phonological smoothing between the verb and PAM such that they form one continuous movement contour. Further, there may also be regressive handshape assimilation, with the handshape of PAM spreading backwards over the preceding main verb. Taken together, these observations suggest that PAM may cliticize to the preceding verb. In this case, the verb sign and PAM form one prosodic word. Steinbach & Pfau (2007) suggest that PAM may further grammaticalize into an affix. If so, this grammaticalization process parallels what has been reported by Wilbur (1999) for verbs and sentence-final unstressed pronouns in ASL, with progressive handshape assimilation from the verb onto the pronoun creating the appearance of a clitic or verbal suffix.

Having sketched the basic characteristics of sign language agreement and of the DGS agreement marker, we next turn to a description of the two ÖGS agreement markers that are the subject of this study. In Section 3, the methodology of our study is explained. In Section 4, we present our results and we also discuss possible origins of the ÖGS agreement markers. Finally, in Section 5, conclusions and questions for further research are presented.

2.   Two agreement markers in ÖGS

The basic sign order in ÖGS is SOV. However, OSV-orders are possible, for instance in the context of agreement verbs or in sentences with plain verbs that are accompanied by an agreement marker. If plain verbs occur without an agreement marker, the basic SOV-order is used to indicate the argument structure. Thus, agreement markers allow ÖGS to have a more flexible word order as compared to plain verb constructions. So far, there have been no studies focusing on possible syntactic positions for ÖGS agreement markers. However, their occurrence is not

restricted to a verb-adjacent position, as they may also appear before the object, like DGS PAM (Rathmann 2003).

In general, both ÖGS agreement markers are used in combination with plain verbs.[5] Hofstätter & Stalzer (2011) note that both signs may also show agreement in sentences involving single agreement verbs, i.e. verbs which can only show agreement by a one-directional path movement from subject to object (e.g. the ÖGS sign GRATULIEREN 'congratulate'). In addition, both agreement markers may mark first/second as well as third person arguments.

In the following, the two agreement markers (AGRM) observed for ÖGS will be described. Due to the lack of valid information on the grammatical properties of the ÖGS agreement markers as well as their lexical source, they are here neutrally glossed based on their phonological form: as AGRM-BC (BC stands for 'Baby C-handshape') and AGRM-MF (MF stands for 'middle finger'), respectively.

2.1 AGRM-BC

As illustrated in Figure 3a, like DGS PAM, AGRM-BC is also produced with the Baby-C-handshape, shows path movement from the subject to the object position, and shows facing towards the object. In addition, both ÖGS agreement markers may also be produced with a reduced path movement, marking only object agreement. This reduced form has also been observed for DGS PAM as well as for AUX-PERSON, an agreement marker in Catalan Sign Language (LSC) (Pfau & Steinbach 2013; Quer & Frigola 2006).

Further, AGRM-BC is sometimes accompanied by the mouthing /auf/, similar to what has been observed for DGS PAM. Furthermore, members of the younger Deaf signer generation frequently use the agreement marker without /auf/. It is also possible for whatever mouthing may be occurring with the main verb to spread over postverbal AGRM-BC, as has been described for DGS PAM.

2.2 AGRM-MF

In addition to the AGRM-BC agreement marker, there is a second ÖGS agreement marker, here glossed as AGRM-MF. AGRM-MF is signed with a forward pointing middle finger, with the other fingers extended and spread, and the tip of the middle finger facing towards the object position (Figure 3b). Like AGRM-BC, AGRM-MF

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5. Note that although there does not exist a substantiated investigation on verb classes in ÖGS, i.e. a survey which focuses on the categorization of single verbs, it is suggested that ÖGS-verbs can also be categorized into the three or two (depending on theoretical framework) groups of verb types which have been described for other sign languages.

(a) AGRM-BC is produced with a Baby-C handshape.

(b) AGRM-MF is articulated with a forward pointing middle finger.

Figure 3. Two agreement markers in ÖGS

shows a clear path movement from the subject to object position as well as facing, and can express agreement with all person arguments. Interestingly, AGRM-MF is not accompanied by a specific mouthing such as /auf/.

While AGRM-MF is assumed to represent an agreement marker in this paper, Skant et al. (2002) described this sign as a kind of index sign which is used in sentences with body-anchored, i.e. plain, verbs to identify the object of the structure (they label it IX-dich ('IX-you$_{ACC.SG}$') in their example, which is cited in (2) (Skant et al. 2002: 54f)).

(2) IX-ich ANRUFEN **IX-dich**
     IX-I phone **IX-you**
     'I phone you.'

In their single example sentence, the marker which identifies the object occurs in postverbal position. Furthermore, Skant et al. (2002) do not mention whether the index sign indicating the object may appear also preverbally, as might be expected given the SOV word order, nor whether it may be used to refer to other arguments, such as the first person object argument, or whether it can be directed from second to third person arguments.

Thus, whereas Skant et al. (2002) mention that the palm faces the object, they do not report that AGRM-MF moves between the subject and object position, but only that there is an index towards the object position. Possibly, they only observed this sign in sentences with a first person subject and a second/third person object argument, that is, not with second/third person subject/object arguments or with first person object arguments, and therefore missed the path movement and facing of AGRM-MF. More specifically, the path movement of AGRM-MF from a first person subject argument towards second/third person arguments or vice versa (as shown by the double arrow 'a' in Figure 4) appears to resemble the movement of common index signs. Hence, the path movement from subject to object position of AGRM-MF is more clearly visible in sentences where it moves between second and/or third person arguments (as indicated by the double arrow 'b').
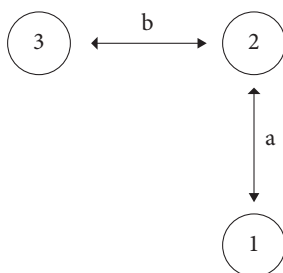

Figure 4.   Path movement of agreement markers in structures involving first person arguments (a) and without first person arguments, i.e. with second/third person arguments (b).

Skant et al. (2002) describe the example in (2) as showing a constituent order of Agent – Action – Object (SVO). In contrast, under the assumption that AGRM-MF represents an agreement marker, we could interpret the sentence as displaying the ÖGS basic SOV-sign order (Skant et al. 2002; Wilbur 2002, 2005) involving a plain verb, with the second person object dropped, which we suggest is possible due to

the agreement morphology expressed by path movement and facing of AGRM-MF occurring after the main verb.[6]

3. Methodology

Given the general absence of information concerning the two ÖGS agreement markers, we designed a study to investigate the two markers and their syntactic behavior in basic sentences involving plain verbs or predicative adjectives. The goals of the experiment were (a) to systematically test the acceptability of sentences involving plain verbs or predicative adjectives in combination with AGRM-BC and AGRM-MF, and (b) to investigate the preferred syntactic position (pre- vs. postverbal) of both ÖGS agreement signs. To that end, we presented transitive structures in which AGRM-BC/AGRM-MF either precedes or follows the verb; we used only full NPs rather than pronouns to avoid ambiguous word orders that might result from pro-drop (which is common in ÖGS).

3.1 Procedure

To further investigate the usage of the two agreement markers in ÖGS in a more systematic way, an online questionnaire survey was conducted. The questionnaire was designed with the Onexp software, an online questionnaire platform, developed at the University of Göttingen (Onea 2011). The questionnaire consisted of five web pages (defined in HTML): a signed instruction video, written demographic questions, two example warm-up sentences, ÖGS sentences for rating by the signers (including the critical stimulus material plus filler sentences), and a finished-stage (design of the online questionnaire adopted from Murmann 2012). All stimulus materials were signed by a Deaf woman who acquired ÖGS starting at age four, uses sign language in her daily life, and is a member of the Deaf community in Austria. She signed in a sitting position in front of a dark blue screen with a distance of 1 to 1.5 meters to the camera. The videos were recorded in full HD quality with an image size of 1920 x 1080 (25 fps).

In the instruction video, the participants were asked to rate each ÖGS sentence on a scale from one to seven with regard to the question whether their Deaf

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6. In general, first person subject/object arguments may be dropped in ÖGS sentences with agreement verbs/markers licensed by agreement morphology. In addition, licensed by context, second/third person arguments of agreement verb structures as well as first/non-first person arguments of plain verb constructions can be deleted (see Lillo-Martin (1986) and Sandler & Lillo-Martin (2006) for a discussion of null arguments in sentences with agreement vs. plain verbs).

friends would sign a sentence like this. The points on the scale were defined as follows: one stood for worst (no one would sign a sentence like this), four meant that the sentence is not ÖGS, but understandable, and seven indicated a grammatically well-formed ÖGS structure. Importantly, the participants were instructed to watch each video once and not to think about their decision for too long, but rather to judge the structures by intuition. To make the task clear and to ensure the reliability of the participants' judgements, two examples, an incorrect and a correct ÖGS sentence, were shown as practice trials.

3.2 Materials and design

In the experiment, we used the experimental factor AGRM, involving the conditions AGRM-BC and AGRM-MF, and the factor ORDER with the conditions pre- and postverbal, resulting in a 2 x 2 design. The same sentence contexts and the same verbs/predicative adjectives were used in all four conditions, that is, in combination with both agreement markers in pre- and postverbal position. Nine plain verbs (LOVE, LIKE, KNOW, WORRY-ABOUT, WAIT, UNDERSTAND, MISS, RESPECT, HUG) and three predicative adjectives (PROUD-OF, ENVIOUS-OF, JEALOUS-OF) were included. Furthermore, all of the stimulus sentences involved third person arguments which are frequently used non-compositional signs that are assumed to be known by ÖGS signers independent of dialect. The constructions in Table 1 exemplify the four conditions (a–d) in which each verb occurred.

Table 1. Each verb was presented in four conditions; that is, with AGRM-BC in postverbal position (a), with AGRM-BC in preverbal position (b), with AGRM-MF in postverbal position (c), and with AGRM-MF in preverbal position (d)

	postverbal	preverbal
AgrM-BC	(a) GIRL IX_{3a} WOMAN IX_{3b} LIKE $_{3a}$AGRM-BC$_{3b}$ 'The girl likes the woman.'	(b) GIRL IX_{3a} WOMAN IX_{3b} $_{3a}$AGRM-BC$_{3b}$ LIKE 'The girl likes the woman.'
AgrM-MF	(c) GIRL IX_{3a} WOMAN IX_{3b} LIKE $_{3a}$AGRM-MF$_{3b}$ 'The girl likes the woman.'	(d) GIRL IX_{3a} WOMAN IX_{3b} $_{3a}$AGRM-MF$_{3b}$ LIKE 'The girl likes the woman.'

To distract participants from strategic processing, additional filler sentences were included which consisted of structures with modal verbs and sentences showing AGRM-BC in combination with different verb types. To ensure that the participants' judgements were reliable, grammatically correct and incorrect ÖGS sentences were included. While the grammatical sentences all displayed the structure Adverb (temporal) – Possessive – NP (Subject) – NP (Object) – Verb, the

incorrect structures all consisted of a Verb – NP – NP – Adverb (temporal) order. To make sure that the incorrect sentences could not be interpreted as topicalized and therefore correct structures, they were signed with a neutral facial expression and without any other specific nonmanual marking (e.g. no body lean, head tilt, brow raise, or eye-gaze). Thus, the whole questionnaire consisted of 48 critical sentences and 88 filler sentences (the filler sentences consisted of 24 sentences involving modal verbs, 32 sentences with AGRM-BC in combination with different verb types, and 32 (in)correct sentences [16 correct/16 incorrect])[7] resulting in 136 sentences. The Onexp software (Onea 2011) directed the participants to one of two lists randomly. In addition, the whole stimulus material was presented in a pseudo-randomized order.

3.3 Participants

Seventeen participants from different areas of Austria (Salzburg, Vienna, Upper Austria, and Tirol) took part in the online questionnaire (thirteen women) with a mean age of 35,4 years. The majority of the Deaf participants were born deaf or lost hearing in the age range of birth to 3 years. Furthermore, most of them acquired ÖGS starting at the age from 4 to 7 years. Three of the Deaf participants acquired ÖGS from their Deaf parents. In addition, two hearing CODAs (hearing persons with Deaf parents) who acquired sign language from their Deaf parent(s) participated in our study.

3.4 Data analysis

For data analysis, that is, to determine the influences of the individual experimental factors and the interaction between factors, analyses of variance were calculated. Thereby, the condition factors ORDER (post- and preverbal) and AGRM (AGRM-BC and AGRM-MF), and the random factors SUBJECTS (Fsubj) and ITEMS (Fitem) were involved. The statistical analysis was carried out hierarchically, that is, only significant interactions ($p < 0.05$) were resolved. To correct for violations of sphericity, the Greenhouse – Geisser (1959) correction was applied to repeated measures with greater than one degree of freedom.

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7. The correct filler sentences showed the ordering Adverb (temporal) – possessive – S – O – V (e.g. YESTERDAY MY BROTHER NEWSPAPER READ). The incorrect sentences showed the order V – first argument (S or O) – second argument (S or O) – Adverb (temporal) (e.g. LAUGH BOSS GRANDFATHER TWO-YEARS-AGO).

4. Results and discussion

4.1 Distribution of the ÖGS agreement markers

Descriptive statistical analysis revealed relatively high mean ratings for all four conditions, that is, all were rated above the level of five (out of seven). Both agreement markers were rated slightly better in preverbal position. The descriptive statistical values mean acceptability ratings (*mean*) and standard deviations (*sd*) are presented in Table 2 with conditions ordered by decreasing mean ratings. In addition, the incorrect filler sentences were rated as bad (*Mean*: 1.24; *sd*: 0.35), and the other grammatical filler sentences were also rated above the level of five except the sentences with modal verbs in sentence-final position (*Mean*: 4.75; *sd*: 1.64).[8]

Table 2. Descriptive statistical values: mean acceptability ratings (*mean*) and standard deviations (*sd*) for all four conditions, i.e. both agreement markers in pre- and postverbal position. The conditions are ordered by decreasing mean ratings

Condition	*mean*	*sd*
AGRM-BC – preverbal	5.76	0.96
AGRM-MF – preverbal	5.51	0.78
AGRM-BC – postverbal	5.41	1.03
AGRM-MF – postverbal	5.03	0.97

The subject analysis revealed a significant main effect ORDER [$F_{subj}(1, 16) = 26.19$; $p < 0.001$]. The item analysis revealed a significant main effect AGRM [$F_{item}(1, 11) = 19.40$; $p < 0.01$] and a significant main effect ORDER [$F_{item}(1, 11) = 16.71$; $p < 0.01$]. The significant ORDER effect is visible in the line plot in Figure 5 below.

The results revealed that both agreement markers are acceptable in pre- and postverbal position, that is, all four conditions showed a mean acceptability rating of above the level of 5 on a 7-point scale. AGRM-BC and AGRM-MF were both rated slightly higher in preverbal position.

To check whether the predicative adjectives (PROUD-OF, ENVIOUS-OF, JEALOUS-OF) were rated differently than the plain verbs, the predicative adjectives were then analyzed separately. This analysis revealed slightly lower mean ratings, at least compared to the more general mean ratings (both plain verbs and predicative

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8. Note that in Krebs et al. (2016), a German text describing this study, a slightly lower mean rating was erroneously reported for AGRM-BC in preverbal position compared to the present results (*Mean*: 5.35; *sd*: 0.93 instead of *Mean*: 5.76; *sd*: 0.96). However, this difference in ratings does not change the overall results.
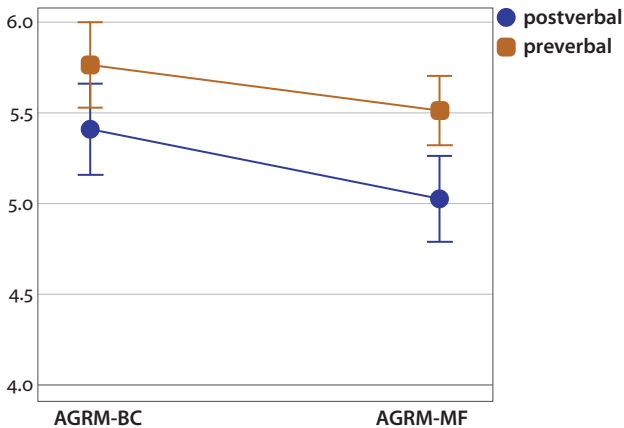
Figure 5. In the line plot, the postverbal condition is indicated in blue and the preverbal position is represented in brown. Mean acceptability ratings from 4 to 6 are represented on the y-axis. Both agreement markers were rated slightly higher in preverbal position.

adjectives) (Table 3). However, the analysis of predicative adjectives also revealed ratings around the level of 5 for all conditions, indicating that they are generally acceptable, with preverbal rated higher than postverbal. Like the combined analysis, the subject analysis for predicative adjectives also revealed a significant ORDER effect [Fsubj(1, 16) = 7.61; $p < 0.05$]. The item analysis revealed a marginally significant main effect AGRM [Fitem(1, 2) = 9.64; $p = 0.09$]. Therefore, these data support the conclusion that both agreement markers are generally accepted in combination with either plain verbs or predicative adjectives.

Table 3. Descriptive statistical values: mean acceptability ratings (*mean*) and standard deviations (*sd*) for all four conditions, i.e. two agreement markers in both pre- and postverbal position for the data involving only predicative adjectives. The conditions are ordered by decreasing mean ratings

Condition	mean	sd
AGRM-BC – preverbal	5.73	1.13
AGRM-MF – preverbal	5.22	1.23
AGRM-BC – postverbal	5.18	1.03
AGRM-MF – postverbal	4.86	1.19

The present study provides the first evidence that ÖGS is one of the (sign) languages that has developed agreement markers to realize agreement in transitive constructions, at least in combination with uninflected plain verbs and predicative adjectives. The results reveal that both agreement markers were rated significantly better in preverbal position. However, all critical conditions were rated relatively

high (all ratings above the level of 5), and the differences in ratings were relatively small, suggesting that the statistical significance may not be all that meaningful linguistically. In particular, the difference in ratings for the pre- in comparison to the postverbal condition was 0.48 for AGRM-MF and 0.35 for AGRM-BC (both below a difference of 0.5). Although these differences in ratings between pre- and postverbal conditions were significant, because systematic, these small differences should not be overrated.[9] We can safely conclude that both agreement markers can occur before or after the main verb/predicative adjective. This observation has implications for the understanding of the grammar of ÖGS and further underscores the cross-linguistic variability within (sign) language structures. In addition, the two ÖGS agreement markers may also contribute to the theoretical understanding of the grammaticalization process for sign language agreement markers. In the next two sections, some cross-linguistic findings with respect to possible syntactic positions of sign language agreement markers as well as possible sources for both ÖGS agreement markers will be discussed.

4.2 Cross-linguistic comparison

Various syntactic positions have been described for the different sign language agreement markers/auxiliaries documented so far. Some of the agreement markers appear only in a relatively fixed sentence position relative to the main verb (either before or after the main verb). For example, all three auxiliaries identified in Taiwanese Sign Language (TSL; glossed as AUX-1, AUX-2, AUX-11) have to precede the main verb. In particular, the TSL auxiliaries either occur in sentence-initial position or immediately before the main verb (Smith 1990).

Other sign language agreement markers, however, show a more flexible syntactic distribution and thus can appear before as well as after the main verb. Still, one of the syntactic positions (either before or after the main verb) may be observed more frequently than the other. For instance, the auxiliary described for the Sign Language of the Netherlands (*Nederlandse Gebarentaal*, NGT; glossed as ACT-ON) mostly occurs after the main verb, but may also appear in preverbal position (Bos 1994). As already mentioned above, the auxiliary PAM observed in DGS may appear in preverbal (i.e. after the subject; Rathmann 2003) as well as postverbal position (Steinbach & Pfau 2007). It has been argued that these two syntactic positions of PAM reflect dialectal variation, whereby the postverbal option

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9. When using a seven-point scale, 17 subjects is sufficient to provide power for reliable significance when mean differences are 1.5 or greater. With the small mean differences seen here, it is possible that, although statistically significant, the result may not be reliable (that is, might not be seen if the study were re-run).

is characteristic of the Southern German DGS variants (Steinbach 2011). Besides dialectal variation, aspects such as, for example, differences in grammatical function or articulatory reasons have been reported to account for varying syntactic positions in which a particular agreement marker may occur (e.g. Sapountzaki 2012). In addition, some sign language agreement markers may vary in their syntactic positions depending on which verb type they co-occur with. For example, the indexical agreement auxiliary of Indopakistani Sign Language (IPSL; glossed as AUX) appears in sentence-final position when it accompanies a plain verb, but has a more flexible distribution when co-occurring with an agreement verb (in which case it may precede or follow the verb; Zeshan 2000).

The present study revealed that both of the ÖGS agreement markers may appear in pre- as well as postverbal position. However, our findings do not allow any conclusions regarding factors that might influence the position of the agreement markers. That is, we are not yet in a position to determine (i) whether these two different syntactic positions reflect dialectical variation, (ii) whether the agreement markers occurring in different positions yield different grammatical functions, or (iii) whether the agreement markers are simply (equally) acceptable in pre- as well as postverbal position (without involving any dialectical variation or different grammatical functions). These potentially relevant factors have to be tested in future studies.

4.3 Speculations on the grammaticalization of ÖGS agreement markers

So far, the use of an agreement marker which has developed from a nominal source has been reported for only three sign languages – DGS, LSC, and Spanish Sign Language (LSE) (Rathmann 2003; Pfau & Steinbach 2006; Quer & Frigola 2006; Costello 2015). Due to the facts that (i) AGRM-BC shows the same phonological form as PAM in DGS and (ii) the ÖGS sign PERSON is phonologically identical to the sign for PERSON in DGS, LSC and LSE, it seems reasonable to assume that AGRM-BC also developed from the noun PERSON. If correct, ÖGS AGRM-BC represents the fourth example for the grammaticalization of an agreement marker from a noun and therefore provides a further case for the modality-specific grammaticalization path from noun via indexical sign to auxiliary proposed by Pfau & Steinbach (2013). Possibly, the development from a noun to an agreement marker is not as exceptional in sign languages as has been assumed. To shed further light on this issue, additional descriptions of agreement markers in other sign languages which have not been investigated so far are needed.

With respect to AGRM-MF, a suggestion for a possible grammaticalization path is not as straightforward as for AGRM-BC. Recalling that Skant et al. (2002) interpreted AGRM-MF as a type of index-marker for objects, we could suggest that

AGRM-MF has a pronominal origin. As already mentioned above, a possible source for the grammaticalization of sign language agreement markers are adjacent pointing/indexical signs, i.e. pronouns, which are combined into a single sign (e.g. AUX-1 in TSL and AUX in IPSL). When they become concatenated, this form of agreement marker consists of an initial index sign towards the R-locus associated with the subject position followed by a smooth movement towards the object position. Hence, the short, tensed movement characteristic of the individual pronouns disappears, and the agreement marker is formed by one continuous path movement (Pfau & Steinbach 2006). With respect to the handshape of AGRM-MF, to the best of our knowledge, no agreement marker/auxiliary has been described yet which is assumed to have developed from indexical/pronominal signs but does not show an index-handshape. Additionally, at least in modern ÖGS, pronouns are never realized with an outstretched middle finger, i.e. the handshape of AGRM-MF. Although these may be arguments against the assumption that AGRM-MF evolved from a pronominal source, one could perhaps argue that the grammaticalization process leading to AGRM-MF was accompanied by a phonological change which turned the original index-handshape (of the pronouns) into the handshape now used with AGRM-MF. However, an argument along these lines would raise the question of why ÖGS signers should use this different (and more marked) handshape for AGRM-MF even though they use the regular handshape in index-signs for referencing arguments in signing space. One possible explanation might be that in ÖGS, the handshape used to articulate AGRM-MF is relatively frequent.[10] Hence, many one- as well as two-handed ÖGS signs of different lexical categories display this handshape. For example, the AGRM-MF-handshape is used for nouns (e.g. the two-handed sign KULTUR 'culture'), verbs (e.g. the one-handed sign KRITISIEREN 'criticize'), and adjectives (the one-handed sign WEISS 'white').

According to an alternative grammaticalization scenario, AGRM-MF evolved from the ÖGS possessive/existential/locative marker glossed as DA, produced by a symmetrical two-handed sign with the same handshape as AGRM-MF, but with the fingertips pointing downwards during a vertical downward movement (Figure 6). The sign DA is used to express possession, as in (3) from Skant et al. (2002: 130):

(3) (IX-ich) GELD   DA
     (IX-I)   money (t)here
     'I have money.'

Nevertheless, there is probably no handshape which is more frequent than the index pointing handshape.
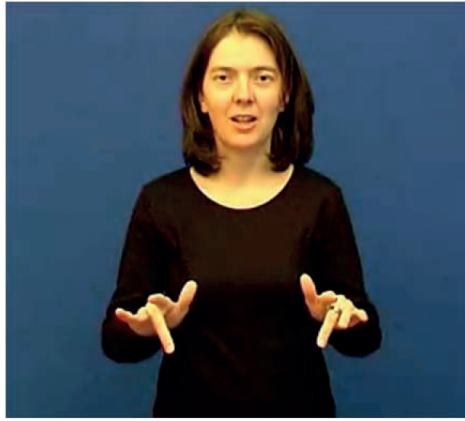
Figure 6. The ÖGS possessive/existential/locative marker glossed as DA (from the online database Leda Sila – Lexical Database for Sign Languages; http://ledasila.aau.at; Krammer et al. 2001).

According to Skant et al. (2002), DA can occur either after the object, as in (3), or before the object. However, the sign DA can have other functions such as indicating existence, or as a form of indexical sign to express locative information, as in (4a) (Chen Pichler et al. 2008). The same locative relation could also be expressed by an index sign, as shown in (4b).

(4)　a.　IX-ich DA
　　　　　'I am there.'
　　　b.　IX-ich IXa
　　　　　'I am there.'

Thus, instead of changing the index-handshape to the AGRM-MF-handshape during the grammaticalization process, it seems more plausible that AGRM-MF developed from DA occurring in its indexical function. In both scenarios, however, an indexical source is assumed for the development of AGRM-MF. A further argument in favor of an indexical source account is the observation that AGRM-MF is not accompanied by any mouthing such as /auf/, which would suggest some remnant of its lexical source. This accords with the observation that other agreement markers described to date which derive from indexical signs are not accompanied by any mouthing either (Sapountzaki 2012).[11]

　　However, an argument against an indexical source hypothesis may be that in contrast to indexical agreement markers, AGRM-MF shows a different form of facing. Thus, while the indexical agreement markers described for other sign

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11. However, it cannot be excluded that AGRM-MF was accompanied by some sort of mouthing in former times.

languages start with the finger pointing towards the subject position and end with the finger pointing towards the object position, AGRM-MF does not include initial pointing toward the subject, that is, a change in orientation . One could only speculate that AGRM-MF once involved initial pointing towards the subject position, which has disappeared or otherwise assimilated to the path movement towards the object position.

According to yet another grammaticalization scenario, AGRM-MF might have evolved from AGRM-BC or vice versa, and only the handshape changed. Although this option cannot be fully excluded, the syntactic as well as phonological differences between AGRM-BC and AGRM-MF observed so far render this account implausible. One observation speaking against such a derivational hypothesis is that AGRM-BC and AGRM-MF differ with regard to their mouthing behavior. In particular, AGRM-BC may be accompanied by /auf/ (or has been accompanied by /auf/ more frequently in former times), while AGRM-MF lacks any form of mouthing.

Finally, it could be hypothesized that AGRM-MF evolved from the verb BETROFFEN ('affected') which involves the same handshape as AGRM-MF (Figure 7). Maybe the semantics of the verb, which denotes an abstract transfer relation of 'to be affected by something/somebody', led to the development of an agreement marker from the verb. Interestingly, BETROFFEN is a plain verb and thus cannot be spatially inflected. However, it does involve a path movement towards the contralateral side of the signer's chest with the fingertip of the middle finger facing the signer's body. Thus, the phonological form of the verb BETROFFEN, characterized by direction of path movement as well as hand orientation, could have been easily modulated into a directional morpheme which can be moved between different R-loci in order to express verbal agreement. Moreover, that two agreement markers that evolved

Figure 7. The ÖGS sign BETROFFEN ('affected') (from the online data base Leda Sila – Lexical Database for Sign Languages; http://ledasila.aau.at; Krammer et al. 2001).

from different lexical sources co-exist in one sign language is not unheard-of (see e.g. Smith (1990) for TSL and Costello (2015) for LSE).

Nevertheless, due to the lack of earlier ÖGS material, we can only offer speculation about the lexical sources AGRM-BC and AGRM-MF might have evolved from. Thus, more detailed investigations on the differences and similarities of AGRM-BC and AGRM-MF – for instance, with regard to their distribution (i.e. with which verb types they can be combined, or in which semantic and pragmatic contexts they can occur) – are necessary before it will be possible to draw further conclusions on the grammaticalization of both ÖGS agreement markers as well as on their possible relation to each other.

5.   Conclusions and questions for further research

The present study provided the first description of two ÖGS agreement markers. We presented empirical evidence concerning the use and syntactic distribution of these agreement markers. In addition, some speculations with respect to possible grammaticalization paths of both agreement markers were offered. By extending the list of sign languages using agreement markers, the present findings on AGRM-BC/AGRM-MF in ÖGS may contribute to comparative cross-linguistic investigations which (a) focus on the commonalities and differences with regard to the usage of agreement markers/auxiliaries across sign languages, (b) compare how transitive argument relations are expressed in the world's languages, and (c) investigate the grammaticalization of agreement markers in sign languages.

Future studies should focus on possible commonalities and differences between AGRM-BC and AGRM-MF. Questions that require further investigation include, for instance: (a) Which group of signers uses AGRM-BC/AGRM-MF? and (b) Does the occurrence of AGRM-BC/AGRM-MF depend on the grammatical environment, i.e. do the markers only occur in a specific (and possibly different) pragmatic context or only with certain verbs? The results we have compiled so far add to our understanding of the use and distribution of the two markers, but they are still preliminary.

With respect to the first question, it can be noted that Deaf informants from different parts of Austria confirmed that both agreement markers are used in various areas of Austria and therefore seem not to be regionally restricted. In addition, also in the present study, ÖGS-signers from different parts of Austria rated both agreement markers as acceptable. However, whether the usage of AGRM-BC and AGRM-MF depends on dialectical variation would have to be tested with a larger and a more systematic sample of participants.

Furthermore, some signers informally mentioned that there are signers who use only AGRM-BC but not AGRM-MF, or vice versa. Clearly, this does not support the assumption that only certain verbs may combine with AGRM-BC and others with AGRM-MF, or that the usage of the agreement markers is dependent on pragmatic context. All ratings reported in the present study involved both agreement markers in combination with the same set of verbs in identical sentence contexts. Importantly, the results did not reveal any differences with regard to acceptability by verb. Thus, the fact that not all Deaf signers use both forms of agreement markers suggests that the two signs are not mutually exclusive and can be used interchangeably, that is, they are not essentially necessary to express a specific transitive relation with a certain verb in ÖGS. Presumably, sociolinguistic aspects such as personal style and/or age of the ÖGS signers might also have an influence on which of the two markers is chosen. In addition, whether semantic and/or phonological properties of verbs, semantic characteristics of the arguments, or the pragmatic context lead to a preference of the ÖGS-signers for choosing one agreement marker over the other will have to be investigated in more detail in future studies.

Another open question is with which verb types the ÖGS agreement markers may be combined. In the current study, we only presented AGRM-BC and AGRM-MF in sentences involving plain verbs, but perhaps these markers may also co-occur with uninflected or inflected agreement verbs (as reported by Bos (1994) for NGT and by de Quadros & Quer (2008) for LSC). Whether AGRM-BC/AGRM-MF are restricted to indicate agreement with animate arguments, how plurality is marked in sentences with each agreement marker, and whether the two markers may take on additional grammatical functions, such as reciprocal or even aspectual marking, are issues for further studies. Finally, future investigations should test in which additional sentence positions the agreement markers can occur and how the agreement markers may interact with modal verbs, negation signs, and pronominal signs. This may provide further information about the syntactic status of the ÖGS agreement markers.

Acknowledgements

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Appendix: Stimulus materials

(i) Plain verbs

The woman loves the man.

> WOMAN IX$_{3a}$ MAN IX$_{3b}$ LOVE $_{3a}$AGRM-BC$_{3b}$
> WOMAN IX$_{3a}$ MAN IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ LOVE
> WOMAN IX$_{3a}$ MAN IX$_{3b}$ LOVE $_{3a}$AGRM-MF$_{3b}$
> WOMAN IX$_{3a}$ MAN IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ LOVE

The girl likes the woman.

> GIRL IX$_{3a}$ WOMAN IX$_{3b}$ LIKE $_{3a}$AGRM-BC$_{3b}$
> GIRL IX$_{3a}$ WOMAN IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ LIKE
> GIRL IX$_{3a}$ WOMAN IX$_{3b}$ LIKE $_{3a}$AGRM-MF$_{3b}$
> GIRL IX$_{3a}$ WOMAN IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ LIKE

The child knows the doctor.

> CHILD IX$_{3a}$ DOCTOR IX$_{3b}$ KNOW $_{3a}$AGRM-BC$_{3b}$
> CHILD IX$_{3a}$ DOCTOR IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ KNOW
> CHILD IX$_{3a}$ DOCTOR IX$_{3b}$ KNOW $_{3a}$AGRM-MF$_{3b}$
> CHILD IX$_{3a}$ DOCTOR IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ KNOW

The father is worried about the girl.

> FATHER IX$_{3a}$ GIRL IX$_{3b}$ WORRY-ABOUT $_{3a}$AGRM-BC$_{3b}$
> FATHER IX$_{3a}$ GIRL IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ WORRY-ABOUT
> FATHER IX$_{3a}$ GIRL IX$_{3b}$ WORRY-ABOUT $_{3a}$AGRM-MF$_{3b}$
> FATHER IX$_{3a}$ GIRL IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ WORRY-ABOUT

The woman waits for the doctor.

> WOMAN IX$_{3a}$ DOCTOR IX$_{3b}$ WAIT $_{3a}$AGRM-BC$_{3b}$
> WOMAN IX$_{3a}$ DOCTOR IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ WAIT
> WOMAN IX$_{3a}$ DOCTOR IX$_{3b}$ WAIT $_{3a}$AGRM-MF$_{3b}$
> WOMAN IX$_{3a}$ DOCTOR IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ WAIT

The mother understands the boy.

> MOTHER IX$_{3a}$ BOY IX$_{3b}$ UNDERSTAND $_{3a}$AGRM-BC$_{3b}$
> MOTHER IX$_{3a}$ BOY IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ UNDERSTAND
> MOTHER IX$_{3a}$ BOY IX$_{3b}$ UNDERSTAND $_{3a}$AGRM-MF$_{3b}$
> MOTHER IX$_{3a}$ BOY IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ UNDERSTAND

The boy misses the grandmother.

> BOY IX$_{3a}$ GRANDMOTHER IX$_{3b}$ MISS $_{3a}$AGRM-BC$_{3b}$
> BOY IX$_{3a}$ GRANDMOTHER IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ MISS
> BOY IX$_{3a}$ GRANDMOTHER IX$_{3b}$ MISS $_{3a}$AGRM-MF$_{3b}$
> BOY IX$_{3a}$ GRANDMOTHER IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ MISS

The girl respects the mother.

GIRL IX$_{3a}$ MOTHER IX$_{3b}$ RESPECT $_{3a}$AGRM-BC$_{3b}$
GIRL IX$_{3a}$ MOTHER IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ RESPECT
GIRL IX$_{3a}$ MOTHER IX$_{3b}$ RESPECT $_{3a}$AGRM-MF$_{3b}$
GIRL IX$_{3a}$ MOTHER IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ RESPECT

The man hugs the grandfather.

MAN IX$_{3a}$ GRANDFATHER IX$_{3b}$ HUG $_{3a}$AGRM-BC$_{3b}$
MAN IX$_{3a}$ GRANDFATHER IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ HUG
MAN IX$_{3a}$ GRANDFATHER IX$_{3b}$ HUG $_{3a}$AGRM-MF$_{3b}$
MAN IX$_{3a}$ GRANDFATHER IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ HUG

(ii) Predicative adjectives

The mother is proud of the boy.

MOTHER IX$_{3a}$ BOY IX$_{3b}$ PROUD-OF $_{3a}$AGRM-BC$_{3b}$
MOTHER IX$_{3a}$ BOY IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ PROUD-OF
MOTHER IX$_{3a}$ BOY IX$_{3b}$ PROUD-OF $_{3a}$AGRM-MF$_{3b}$
MOTHER IX$_{3a}$ BOY IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ PROUD-OF

The man is envious of the boss.

MAN IX$_{3a}$ BOSS IX$_{3b}$ ENVIOUS-OF $_{3a}$AGRM-BC$_{3b}$
MAN IX$_{3a}$ BOSS IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ ENVIOUS-OF
MAN IX$_{3a}$ BOSS IX$_{3b}$ ENVIOUS-OF $_{3a}$AGRM-MF$_{3b}$
MAN IX$_{3a}$ BOSS IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ ENVIOUS-OF

The father is jealous of the man.

FATHER IX$_{3a}$ MAN IX$_{3b}$ JEALOUS-OF $_{3a}$AGRM-BC$_{3b}$
FATHER IX$_{3a}$ MAN IX$_{3b}$ $_{3a}$AGRM-BC$_{3b}$ JEALOUS-OF
FATHER IX$_{3a}$ MAN IX$_{3b}$ JEALOUS-OF $_{3a}$AGRM-MF$_{3b}$
FATHER IX$_{3a}$ MAN IX$_{3b}$ $_{3a}$AGRM-MF$_{3b}$ JEALOUS-OF

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