

Unexpressed Features of Verb Agreement in Signed Languages

Christian Rathmann
The Ohio State University
rathmann.1@osu.edu

Gaurav Mathur
Haskins Laboratories, Yale University
mathur@haskins.yale.edu

1. Introduction

The goals of this paper are two-fold. First, it examines the extent of cross-linguistic variation in the expression of person and number features through verb agreement in three signed languages: American Sign Language (ASL), German Sign Language (DGS) and Japanese Sign Language (Nihon Shuwa). Second, it discusses how two different morphological approaches handle the cross-linguistic phenomena revealed in the study.

Background: The working definition of verb agreement adopted here is a syntactic relationship between a verb and its arguments that is encoded by a morphological process expressing the features of the arguments.

In all the signed languages documented to date, verbs fall into one of three inflectional classes depending on their argument structure. The first inflectional class includes all verbs that have two animate arguments as part of their argument structure. The second inflectional class involves verbs of motion and location, while the third inflectional class contains the rest of verbs: intransitives, and transitives that have one animate argument along with other inanimate arguments. These inflectional classes correspond roughly to Padden's (1983, 1990) classes of agreement, spatial and plain verbs, which are based on morphological criteria rather than argument structure.

The paper focuses on the first inflectional class, since only verbs in this class show agreement with their arguments in person and number.¹ Verbs in the second inflectional class agree with their arguments in different features, which require separate treatment. The verbs in the last inflectional class do not exhibit any agreement. While some of these verbs may be modulated for aspectual inflection like continuative, iterative and habitual, this inflection is distinct from agreement with an animate argument. Moreover, some verbs have more than one meaning; each meaning may be associated with a different argument structure so that a verb may appear in more than one inflectional class. For example, the ASL verb TEACH can select for two animate arguments (as in *I teach him*) and appear in the first inflectional class, or it can select for one animate argument and an inanimate argument (e.g. *I teach mathematics*) and appear in the third inflectional class. The paper focuses on those senses that fit the argument structure of verbs in the first inflectional class.

¹ Gender and other possible agreement features do not seem to play a role in verb agreement in the signed languages researched to date. This is also true for Nihon Shuwa, even though it has "gender morphemes" that appear throughout its lexicon (Supalla and Osugi 1996, Fischer 1996).

Roadmap: The paper starts with a description of verb agreement in the three signed languages. Specifically, it shows how person and number features are expressed (section 2). Next, it turns to cases where the expression of person and number features is blocked for some reason and introduces the notion of unexpressed features (section 3). The next section clarifies how these unexpressed features constitute special cases of syncretism and points out unique features of these cases (section 4). To account for the case of syncretism, two approaches are introduced and compared: an inferential-realizational approach and a lexical-realizational approach (section 5).

2. Person and Number Features

2.1 Person

The person feature may be theoretically decomposed into two subfeatures, [+/- 1] and [+/- 2] (Noyer 1992, Halle 1997 and Frampton 2002). The combinations of these subfeatures yield the following values: [+1], [+2] = first person inclusive; [+1], [-2] = first person exclusive; [-1], [+2] = second person; and [-1], [-2] = third person.

In the case of signed languages, it is not necessary to use the subfeature [+/- 2] for two reasons. First, there is no grammatical distinction between second and third person (Meier 1990). For example, the pronoun for second person is identical to the pronoun for third person; the distinction is seen only at the pragmatic level. Second, there seems to be no distinction between inclusive and exclusive first person at the grammatical level; rather, the distinction is made at the pragmatic level. There are no pronouns that are just inclusive nor are there pronouns that are purely exclusive (Cormier 2002). If there is no formal distinction between second and third person, and if there is no linguistic distinction between exclusive and inclusive first person, it is sufficient to use just the [+/- 1] subfeature for signed languages.

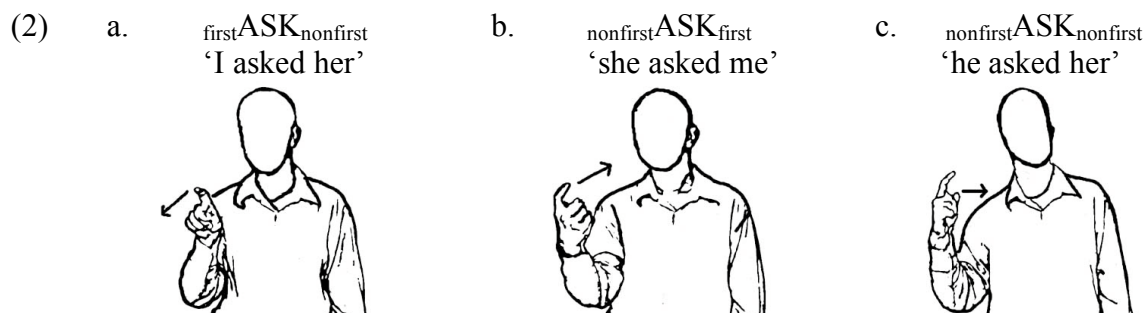
- (1) Person features for signed languages
 - [+1] = first person
 - [-1] = nonfirst person

All the signed languages mark agreement with these features in the same way. Some verbs mark the person feature of the object only (called ‘single agreement’) while other verbs mark the person feature of both the object and the subject (called ‘double agreement’). Agreement is manifested through a change in the direction of movement and/or orientation of the verb so that the hand points toward the location of the object referent (and away from the location of the subject referent).

The location for first person referent is the center of the signer’s chest. The location for a nonfirst person referent corresponds to one’s conceptualization of it within signing space, defined roughly as the empty area in front of the signer’s body. (Rathmann and Mathur 2002, see also Aronoff, Meir and Sandler 2000, Lillo-Martin 2002 and Liddell 2003).

Thus, for a first person subject and a nonfirst person object, the verb moves from the center of the chest to the location of the nonfirst person referent. At the same time, the palm of the hand faces the location of the nonfirst person referent. This is illustrated

below with the ASL sign ASK in (2a). When the person features of the subject and object are reversed (i.e. a nonfirst person subject and a first person object), so is the direction of the movement and the orientation of the palm (see 2b).



The third illustration on the right (2c) shows the form for a nonfirst person subject and a nonfirst person object. In this case, the palm of the hand faces the location of the object referent and the hand moves from the location of the subject referent to that of the object referent.

Below are examples of verbs in each signed language that undergo agreement with the object (and the subject) in its person feature. Some of the verbs change only in direction of movement, while others change only in orientation of the hand, while yet others change in both. It does not matter which specific change occurs, as long as some change occurs to mark the person feature of the object and subject.

(3) Examples of verbs showing person agreement in ASL, DGS and Nihon Shuwa

ASL	DGS	Nihon Shuwa
ASK	BESUCHEN 'visit'	DAMASU 'deceive'
BOTHER	ENTLASSEN 'fire'	HIHAN-SURU 'criticize'
FILM	IGNORIEREN 'ignore'	KOTAERU 'answer'
JOIN	SCHIMPFEN 'bawl-out'	OKORU 'be angry at'
SAY-NO	VERSPOTTEN 'tease'	RENRAKU-SURU 'contact'

There are no differences across the signed languages with respect to the expression of person features.

2.2 *Number*

The signed language literature assumes that there are four possible values for the number feature: singular, dual, exhaustive and multiple (Klima and Bellugi 1979, Padden 1983).

Here, this paper assumes just two values for the feature of number: singular and multiple. It does not count 'exhaustive' as a possible value for the feature of number, because it is assumed for now that the exhaustive form results from several instances of singular agreement, one for each conjoined noun phrase. This is consistent with the

meaning of the exhaustive form that events are distributed over different individuals.² The conjoined agreement forms may be then phonologically reduced. The ‘dual’ form is also not included, since it is taken to be a subcase of the ‘exhaustive’ form, i.e. it consists of two instances of singular agreement, one for each of the noun phrases.

For the purpose of this paper, the two values of the number feature are defined in terms of the binary feature [+/- pl]. The number feature is defined in terms of the plural feature rather than the singular feature, because, as seen below, the plural feature is marked by a morphological process, whereas the singular feature is not marked.

(4) Number features for signed languages

[-pl] = singular

[+pl] = plural

DGS and ASL mark agreement with these features in the same way. Verbs mark the [-pl] feature of a subject or an object through zero marking. All of the examples above show zero marking for number and thus show agreement with a singular subject and a singular object.

Verbs mark the [+pl] feature of an object through the insertion of a horizontal arc into the movement of the verb stem. The overall result is that the hand makes a sweeping motion roughly in the location of the object referent. The [+pl] feature may be marked for a nonfirst person object (see 5a) or for a first person object (see 5b). Note that the plural marking is produced simultaneously as the marking for person, which is manifested through a change in the orientation of the palm.

(5) a. $\text{first}(\text{sg})\text{ASK}_{\text{nonfirst}(\text{pl})}$ ‘I asked them’



b. $\text{nonfirst}(\text{sg})\text{ASK}_{\text{first}(\text{pl})}$ ‘he asked us’



For the [+pl] feature of an subject, there is zero marking (in other words, the ‘multiple’ form is not available for a subject, Padden 1983). Thus, marking for the number feature of the subject is ambiguous between singular and plural in the absence of context.

Not all verbs allow the plural marking for the object. For example, the ASL sign STAB means to stab a person in the back with a knife. It is not possible to stab many people at once. The ‘multiple’ form then cannot be used with verbs that require distributed events for a plural entity. (In such cases, the ‘exhaustive’ form may be used.) Here are examples of verbs that allow plural marking for the object in ASL and DGS.

² Padden (1983) distinguishes a similar form that is done more slowly and clearly for each participant’s location. Here, this difference is taken to be one of specified vs. unspecified individuals, but both still involve singular agreement for each conjoined noun phrase.

(6) Examples of verbs showing number agreement in ASL and DGS

ASL	DGS
ASK	FRAGEN ‘ask’
BAWL	HELFEN ‘help’
FILM	INFORMIEREN ‘inform’
GIVE	VERBESSERN ‘correct’
SAY-NO	VERTEIDIGEN ‘defend’

Nihon Shuwa, unlike ASL and DGS, does not seem to use the ‘multiple’ form regularly. Rather, it uses the singular form for both singular and plural noun phrases. No examples are thus provided from this language.

In sum, there are six possible combinations of features that an agreeing verb in ASL and DGS can show overt marking for:

(7) Combination of features that can be overtly marked on the verb in signed languages:

- a. **First person singular subject and nonfirst person singular object**
(e.g. *I to you*)
- b. **Nonfirst person singular subject and first person singular object**
(e.g. *you to me*)
- c. Nonfirst person singular subject and nonfirst person singular object
(e.g. *you to him*)
- d. **First person singular subject and nonfirst person plural object**
(e.g. *I to y’all*)
- e. **Nonfirst person singular subject and first person plural object**
(e.g. *you to us*)
- f. Nonfirst person singular subject and nonfirst person plural object
(e.g. *you to them*)

Nihon Shuwa, which does not mark plural, shows overt marking only for the combination of features in (7a) through (7c).

Since verbs marking (7b) always mark (7c), and likewise those marking (7e) always mark (7f), the (7b) and (7c) forms are collapsed together, and the (7e) and (7f) forms together. The rest of the paper thus focuses only on four of these combinations (7a, b, d, e). These forms are schematically represented below.

(8)

(7a)	(7b)	(7d)	(7e)
addressee ○ ↑ ○ signer	addressee ○ ↓ ○ signer	addressee ○ ↘ ○ signer	addressee ○ ↘ ○ signer
first sg subj, nonfirst sg obj	nonfirst sg subj, first sg obj	first sg subj, nonfirst pl obj	nonfirst sg subj, first pl obj
‘I to you’	‘you to me’	‘I to y’all’	‘you to us’

Since the expression of person features is the same across the three signed languages, and since the number feature is expressed in the same way in ASL and DGS and not expressed in Nihon Shuwa, ASL data will be used for illustration for ease of exposition, and where relevant, differences from other signed languages will be pointed out.

3. Unexpressed Features

There are verbs that *should* show agreement with a subject and object in person and number yet do not manifest all of the marking overtly. Four examples from ASL illustrate this point. The first three examples (FLATTER, FLIRT and ANALYZE) show that the lack of marking can be due to some phonological reason; the last example (TEST) shows that the lack of marking can be due to the fact that it has not yet been grammaticized as a verb showing agreement.

The first example is the ASL sign FLATTER. It can be modulated to show person. That is, it can mark agreement with first person subject singular and nonfirst person object singular (see 9a) and with nonfirst person subject singular and first person object singular. It, however, cannot be modulated to show plural number, whether this feature is combined with first or nonfirst person. For example, to agree with a nonfirst person plural object, a horizontal arc movement must be inserted into the sign (see 9b). It is not possible to produce this movement simultaneously with the lexical movement of the sign, because they use the same joints of the arm differently. It is also not possible to produce the arc movement after the lexical movement due to a principle of phonological well-formedness that constrains movement in a sign to a complex one. In such cases, ASL forgoes the marking for the plural feature on the verb.

(9) a. $_{\text{first}(\text{sg})}\text{FLATTER}_{\text{nonfirst}(\text{sg})}$



b. $^*_{\text{first}(\text{sg})}\text{FLATTER}_{\text{nonfirst}(\text{pl})}$



Another example is the ASL sign FLIRT, which requires contact between the thumbs of the two hands, as shown in (10a). While the sign can show agreement with nonfirst person singular and plural object, it cannot agree with a first person object because this form violates principles of phonological well-formedness. For instance, one way is to twist the arms inwards, while preserving contact between the thumbs, so that the fingers point to the chest, as depicted in (10b). While this option is articulatorily feasible, it is not possible because the side-by-side relation between the hands is a lexical property that must be preserved. Given that such options are not available, ASL does not express the first person feature on the verb.

(10) a. $\text{first}(\text{sg})\text{FLIRT}_{\text{nonfirst}(\text{sg})}$



b. * $\text{nonfirst}(\text{sg})\text{FLIRT}_{\text{first}(\text{sg})}$



Yet another example is the ASL sign ANALYZE. It can show agreement with first and nonfirst person singular noun phrases (see 11a); it can also show agreement with a nonfirst person plural object. Yet it cannot show agreement with a first person plural object. The reason is again phonological. This sign involves both hands in an upright posture. To agree with a first person plural object, the arms must be twisted so that the palms face the signer's body; in addition, the arms must move in an horizontal arc (see 11b). This places the nondominant arm in an articulatorily awkward configuration. To avoid this configuration, the language marks only the first person feature, leaving the plural feature unexpressed for a first person object.

(11) a. $\text{first}(\text{sg})\text{ANALYZE}_{\text{nonfirst}(\text{sg})}$



b. * $\text{nonfirst}(\text{sg})\text{ANALYZE}_{\text{first}(\text{pl})}$



Phonetic/phonological constraints are not the only reason that a verb can fail to mark all the features of a noun phrase. Another reason may be that it takes time for some verbs to become grammaticized as verbs that show agreement. For example, older generations of ASL signers do not express the first person feature of an object on TEST, because the sign has no direction of movement that could be changed under agreement, as seen in (12a). In contrast, a sign like HELP involves path movement, whose direction is readily changed under agreement to show first person object agreement. It is only over time that a change in orientation becomes sufficient for showing agreement on verbs like TEST (see 12b).

(12) a. $\text{first}(\text{sg})\text{TEST}_{\text{nonfirst}(\text{sg})}$



b. $\text{nonfirst}(\text{sg})\text{TEST}_{\text{first}(\text{sg})}$



Verbs vary in how far they travel along the path of grammaticization from not showing any features to showing features. Variation also appears across generations of

are determined by looking across the paradigms of verbs. If a form is substituted for another form in some but not all paradigms of a verb, syncretism is unidirectional. For example, in the preterite paradigms but not in the other paradigms, a Bulgarian verb's 2nd person singular forms are the same as the third person singular forms (see table 2.3 in Stump 2001: 39).

If the first form is substituted for the second form for some verbs and if it happens the other way around for other verbs, syncretism is bidirectional. For instance, in Rumanian, for verbs in some conjugations, the first person singular form is the same as the third person plural form. For verbs in other conjugations, it is the other way around (see table 7.1 in Stump 2001: 213).

Unstipulated syncretism occurs when there are never distinctive forms for two feature sets in a certain context; if the two feature sets form a natural class, it is sufficient to posit one form for this natural class. In the same example from Rumanian, the third person singular form and the third person plural form are always the same in the present tense for verbs in one conjugation.

If the two feature sets do not form a natural class, yet if there is a systematic syncretism between these sets across paradigms and across verbs, this syncretism is called symmetric. In Rumanian, the first person singular form is the same as the first person plural form in the imperfect tense for all verbs (see table 7.2 in Stump 2001: 215).

The verb agreement patterns in signed languages illustrate two different cases of syncretism. One case is unidirectional while the other case is unstipulated. The first case of syncretism occurs for verbs in the first four columns of the table in (13). Let us go over each column. The first column contains verbs that do not express any features. The forms are syncretized as follows:

(14) Syncretism for verbs that do not express any feature (e.g. KNOW)

(7b) → (7a)

(7d) → (7a)

(7e) → (7a)

This syncretism is unidirectional, because forms for (7b) through (7e), which are distinctive on other verbs, are substituted by the same, singular form. The second column lists verbs that do not express plural features. In such cases, the forms syncretize to singular forms:

(15) Syncretism for verbs that do not express plural features (e.g. FLATTER):

(7d) → (7a)

(7e) → (7b)

This syncretism is unidirectional because there are distinctive forms for (7c) and (7d) on other verbs, yet on the particular verbs above, these forms syncretize to the corresponding singular forms and never the other way around. The next column of verbs do not express the first person feature for an object. In such cases, the forms syncretize to one form, the nonfirst person singular form:

- (16) Syncretism for verbs that do not express first person feature for object (e.g. FLIRT):

(7b) → (7a)

(7e) → (7a)

Note that (7e) could theoretically syncretize to (7b) which preserves the number feature for the object, but this is not what happens. If the person feature syncretizes from first person to nonfirst, so does the number feature from plural to singular. Otherwise, this syncretism is still unidirectional, since there are distinctive forms for (7b) and (7e) (as seen on other verbs). The fourth set of verbs do not express the feature for a first person plural object. In these cases, the form is syncretized to the corresponding singular form.

- (17) Syncretism for verbs that do not express first person plural feature for object

(7e) → (7b)

(e.g. ANALYZE):

Note that this syncretism appears in the second set of verbs. The second set of verbs are actually a subset of the verbs here. As shown above, this syncretism is unidirectional.

All these cases of syncretism are unidirectional. Another case of syncretism is of a different type. This syncretism is unstipulated and occurs in the plural forms for the subject. These forms are always syncretized to the singular form, i.e. there is no distinctive form for the plural feature for a subject. This is true for all verbs in all the signed languages.

- (18) Syncretism in subject number
subject plural → subject singular

In all the cases of syncretism seen so far, there are two features that particularly stand out. First, all of the forms syncretize to the marking for the unmarked feature. Nonfirst person and singular number are both unmarked, so nearly all of the forms syncretize to forms expressing these features. This differs from the usual cases of syncretism seen in spoken languages, which may occur between two marked forms.

The other feature of the syncretism seen above is that it is mostly driven by phonetic-phonological reasons, in contrast to cases of syncretism in spoken languages that can be purely morphological. For example, in the English present-tense paradigm, there is syncretism to a form with a zero affix, i.e. an affix with no phonological content. This contrasts with the affix for the third person singular form, *-s*, which has phonological content. There is no such contrast in the signed languages. Rather, the contrast is between, on the one hand, forms that mark all features overtly and on the other hand, forms that do not mark all of them and that syncretize to forms expressing an unmarked feature, and this contrast is driven by phonetic-phonological factors.

While all three signed languages behave the same way with regard to the above patterns, other signed languages than ASL offer an additional option for expressing the features in case they cannot be expressed on the verb. DGS and Nihon Shuwa may express the features on an auxiliary-like element (called Person Agreement Marker, PAM) (Rathmann 2000). In DGS, PAM may mark singular features (see 19a) or plural features (see 19b), although the latter form is not frequently used. In Nihon Shuwa, PAM has a different phonological form (see 19c) and can mark singular features. It is not clear whether

This approach posits three affixes for subject and object agreement: (i) ‘pl’ which inserts an arc movement onto the verb stem; (ii) ‘1’ which stands for the fixed location of first person, i.e. the chest of the signer; and (iii) ‘0’ which is a placeholder for the location of the non-first person argument (location is to be later matched with content from spatio-temporal conceptual structure at output). At the output of the paradigm function, a process applies that changes the direction of the verb stem according to the locations specified by the affixes. The paradigm holds for both ASL and DGS. The paradigm for Nihon Shuwa is similar except that there are no columns for the plural feature on the object. For DGS and Nihon Shuwa, the features may be expressed on PAM instead of the verb.

The paradigm accommodates all the forms of a verb that shows all features, like ASL ASK. The approach is also able to handle the two types of syncretism seen above. First, the unstipulated syncretism that the verb cannot mark a plural subject is built into the paradigm. In the rows for the subject features, there are no rows that differentiate between singular and plural.

Second, the various cases of unidirectional syncretism are handled by rules of referral (Zwicky 1985) that specify which cells syncretize in which contexts. Here, the relevant contexts are the sets of verbs. Recall that there are four sets of verbs that exhibit varying degrees of syncretism. A rule of referral will be needed for each set of verb:

(21) Rules of referral

- a. If a verb is of the first set (e.g. KNOW), all forms are realized as (7a).
- b. If a verb is of the second set (e.g. FLATTER), the plural form is realized as the singular form.
- c. If a verb is of the third set (e.g. FLIRT), the first person object form is realized as (7a).
- d. If a verb is of the fourth set (e.g. ANALYZE), the first person plural object form is realized as (7b).

Applying these rules of referral to the above paradigm results in the following paradigms, one for each set of verbs.

(22) Paradigms resulting from the application of rules of referral in (16)

1st Set (KNOW)		object			
		first person		non-first person	
		sg	pl	sg	pl
subject	first person			$_1V_0$	
	non-first person				

2nd Set (FLATTER)		object			
		first person		non-first person	
		sg	pl	sg	pl
subject	first person			$_1V_0$	
	non-first person	$_0V_1$		$_0V_0$	

3rd Set (FLIRT)		object			
		first person		non-first person	
		sg	pl	sg	pl
subject	first person			$_1V_{0pl}$	
	non-first person	$_1V_0$			

4th Set (ANALYZE)		object			
		first person		non-first person	
		sg	pl	sg	pl
subject	first person			$_1V_0$	$_1V_{0pl}$
	non-first person	$_0V_1$		$_0V_0$	$_0V_{0pl}$

It is possible that some of the forms are still phonetically unpronounceable, depending on the location used for the non-first person argument. In that case, the verb switches to another paradigm with unmarked forms.

The inferential-realizational approach then relies on rules of referral to handle unexpressed features. The rules of referral are stated in the context of a particular set of verbs; thus it must be stipulated which set a verb belongs to, even though a verb may switch between different paradigms. Apart from the context, the rules of referral are quite similar in that they result in syncretism to the same unmarked forms.

This approach does not make any specific predictions about which direction the development of the agreement system can go in. The paradigms can either become simpler (Carstairs-McCarthy 1991) through increased syncretism to unmarked forms or can become complete through an increased number of distinctive forms for each set of features.

5.2 *Lexical-Realizational Approach*

The lexical-realizational approach assumes that the notion of a paradigm is not required in the grammar. Rather, this approach is based on lists of morphemes, rules for using them and multiple derivations to generate the set of forms. The framework of Distributed Morphology (Halle and Marantz 1993) is used for illustration.

Every word is the result of a series of derivations. In the initial derivation, person and number features of the subject and the object are copied onto the verb. These elements are sent to a ‘morphology’ component that rewrites features through impoverishment rules (Bonet 1991) and spells out the features according to a list of disjunctively ordered morphemes before being submitted to further phonological

processes. If this derivation does not crash due to a violation of a phonetic constraint, the agreement forms are pronounced.

If the derivation crashes, a new derivation is attempted in which the features on the verb are not expressed. In languages with PAM, another option is available: an Agreement Phrase is projected, which is manifested by PAM and the features from the verb; the features are then spelled out on PAM.

After the features for the subject and for the object are copied onto the features of the verb as part of agreement, the features are subject to an impoverishment rule which deletes the plural feature for a subject. This has the effect that a verb (or PAM) never marks a plural subject.

- (23) Impoverishment
[Pl] $\rightarrow \emptyset / ___ [\text{subject}]$

Next, the person and number features are spelled out separately for object and subject agreement respectively. The location for non-first person is left blank, which is to be filled by a location that matches content from spatio-temporal conceptual structure at output.

- (24) Vocabulary items for person agreement
[-1] \leftrightarrow location: $______$
Else \leftrightarrow location: center of chest

- Vocabulary items for number agreement
[Pl] \leftrightarrow insert movement in horizontal arc convex outwards
Else $\leftrightarrow \emptyset$

These spell-outs are then subject to the rule that changes the direction of the verb stem (including the morpheme for a plural feature) according to the locations of subject and object agreement affixes. In case the surface form violates some phonetic constraint(s), the derivation crashes, and another derivation is attempted in which the features of the subject and the object are not copied to the verb. The result is that there is no feature to be spelled out on the verb.

The analysis for DGS is the same as that for ASL, with one difference. If the initial derivation crashes, the next derivation can copy the features to PAM. The features are then spelled out just as if they were on a verb. The analysis for Nihon Shuwa is similar, with one difference. Since the ‘multiple’ is rarely used in the language, the morpheme [Pl] is assumed not to be available in the list of items for number agreement. Given just one item, which is a zero morpheme, number agreement becomes vacuous and may be assumed to be absent altogether.

In sum, the lexical-realizational approach assumes a new derivation each time there is a crash at the phonetic-interface, and each successive derivation expresses fewer features in order to converge. The phonetic constraints are then sufficient for determining whether the features are expressed, so that it is not necessary to stipulate which set a verb belongs to.

Finally, the approach makes a specific prediction regarding the development of the morphological system: due to the principle of economy, the number of crashes at the phonetic interface should be minimized over time; this would push more features to be expressed over time, i.e. there would be less syncretism. Various studies are consistent with this prediction. Verbs that do not express any features gradually express them during

language change (Engberg-Pedersen 1991); children acquire verbs that do not express features before verbs that do (Meier 1982); and verbs that do not express features are used more frequently than verbs that do express them in language innovation (Senghas 1995, Nicaraguan Sign Language; Stack 1999, acquisition of Signed Exact English; Abu-Shara Sign Language, Aronoff, Meir, Padden and Sandler 2003).

6. Summary

This paper has made three points. First, person features are expressed through a change in the direction/orientation of the verb, while number features are expressed through the insertion of a horizontal arc into the movement of the verb.

The second point concerns the extent of cross-linguistic variation. There is no cross-linguistic difference in the expression of the person features. That is, ASL, DGS and Nihon Shuwa express person features in the same way. There is, however, cross-linguistic variation in whether the number feature is expressed or not. It is expressed in ASL and DGS but not in Nihon Shuwa. In ASL and DGS, the number feature is expressed in the same way.

There is cross-linguistic pattern with respect to another property. In all of the signed languages, the person (and number for DGS and ASL) features may be unexpressed. Signed languages vary in whether these features remain unexpressed on the verb (ASL) or whether they get expressed on another element like PAM (DGS and Nihon Shuwa).

The last point is that the unexpressed features constitute cases of syncretism. One kind (singular marking for both singular and plural subjects) is unstipulated, while all the other cases are unidirectional. There are two cross-linguistic generalizations regarding the unidirectional cases of syncretism:

- (25) a. If a verb cannot express the first person feature, it uses the form marking the nonfirst person feature with the other features held constant.
- b. If a verb cannot express the plural feature, it uses the form marking the singular feature with the other features held constant.

These patterns support the assumption that first person and plural number constitute marked features. Moreover the number feature is dependent on the person feature as seen in one case of syncretism.

Two realizational approaches handle these unexpressed features in different ways. Under the inferential-realization approach, unexpressed features are encoded within paradigms that are artificially similar to one another. Under the lexical-realizational approach, they are predicted by crashes at the phonetic interface. Minimizing these crashes is also sufficient to predict the path that verbs take in language change, acquisition and innovation: verbs go from not expressing features to expressing features over time.

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