

Person vs. locative agreement: Evidence from late learners and language emergence

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Abstract

Sign languages are frequently described as having three verb classes. One, ‘agreeing’ verbs, indicates the person/number of its subject and object by modification of the beginning and ending locations of the verb. The second, ‘spatial’ verbs, makes a similar appearing modification of verb movement to represent the source and goal locations of the theme of a verb of motion. The third class, ‘plain’ verbs, is characterized as having neither of these types of modulations. A number of researchers have proposed accounts that collapse all of these types, or the person-agreeing and spatial verbs. Here we present evidence from late learners of American Sign Language and from the emergence of new sign languages that person agreement and locative agreement have a different status in these conditions and we claim their analysis should be kept distinct, at least in certain ways.

Keywords

Verb agreement
Language development
Delayed first language
Language emergence
Sign languages

1 Introduction: Verb classes in sign languages

In very many sign languages, a subset of verbs can be modified in ways that some researchers have analyzed as a kind of *verb agreement*. Verbs that allow for this kind of modification use locations in the signing space ('loci') in a particular way, as described below. First, the loci have to be associated with a referent, either because the referent is physically present in the signing situation (*present referents*) or because the signer has indicated that a particular locus will be used to stand for a referent (*non-present referents*). Pointing signs with pronominal functions reference these spatial loci, known as R(eferential)-loci. Importantly for the present discussion, verbs that show agreement also use these R-loci.

Padden (1983/1988) divided the verbs of American Sign Language (ASL) into three types according to the kind of information they provide about noun phrases in the sentences in which they occur, as follows:

A. (Person) Agreeing verbs¹

Agree with person and number of their arguments (subject and object) by moving between the loci associated with them

B. Spatial verbs

Mark the location/position of a referent by being signed in a particular locus; or show the path and manner of movement of a (theme) referent

C. Plain verbs

Do not indicate this information

An example of a person-agreeing verb is given in (1a), and a spatial verb in (1b)². In (1a), the verb HELP moves from the R-locus associated with the subject (MOTHER), to the R-locus associated with the object (SON), showing person agreement. Other person-agreeing verbs typically behave similarly. In (1b), the spatial verb DRIVE moves from the locus associated with the source location (BOSTON), to the locus associated with the goal location (NEW-YORK), showing locative agreement. Spatial verbs include ones indicating one location in which an event takes place, or two locations for verbs denoting a change in location. Padden also includes so-called classifier predicates in the category of spatial verbs, specifically, those representing the location of an event or movement events.

¹ Padden originally used the term 'inflecting' (1983/1988), but later (1990) adopted the term 'agreeing'. Here we will use the more specific 'person-agreeing', allowing for analyses in which spatial verbs are also marking a kind of agreement.

² We follow the conventions employed in this journal and commonly in sign linguistics of using upper-case English glosses to stand for signs (employing the glosses of ASL Signbank (Hochgesang et al. 2019) wherever possible). For the current purposes, it is important to note how we indicate spatial marking. We use subscripted letters to indicate abstract spatial loci; within an example, multiple uses of the same letter reference the same locus, but not necessarily across examples. At times, a specific locus is described within parenthesis, e.g., (wall).

- (1) a. _____t
 SON IX_a, MOTHER IX_b bHELP_a
 ‘The mother helps the son.’
 (verb with person agreement)
- b. $\text{_____t \quad \text{_____t}}$
 BOSTON_a, NEW-YORK_b, MARY_a aDRIVE_{supb}
 ‘Mary drove from Boston to New York.’
 (verb with locative agreement)

Although other researchers have presented evidence against the analysis of sign language verbs as marking grammatical agreement (e.g., Liddell 2000; Schembri, Fenlon & Cormier 2018), here we will focus on a subset of debates within the general approach that embraces ‘agreement’ as an appropriate term for such modifications (Rathmann & Mathur 2002, 2008; Lillo-Martin & Meir 2011; Pfau, Salzmann & Steinbach 2018). In the years since Padden’s classification was presented, a number of proposals have been made about how to identify verbs of each type and how they might be analyzed. Here we will focus on the proposals made by Meir (1998, 2002).

In her dissertation and much subsequent research, Irit Meir made a number of proposals that improved understanding of the nature of verbs that express agreement. She proposed (Meir 1998, 2002) that a spatial predicate DIR is part of the lexical conceptual structure of both person-agreeing and spatial verbs, and it is this predicate that shows agreement; however, she argued that DIR always agrees with its source and goal NPs, not subjects and objects. On her analysis, person-agreeing verbs differ from spatial verbs because they also use the facing of the hands to indicate the object (via dative case marking). According to this approach, person-agreeing verbs have a component of transfer in their meaning (whether physical or abstract). One consequence of this is that person-agreeing verbs will typically have human subjects and objects. Meir also noted that sometimes phonological factors (required body contact) block agreement in cases where it would be expected (but see Oomen 2017 for discussion of iconic motivations for body-anchoring in NGT (a sign language used in the Netherlands)). These aspects of the analysis help in determining which verbs might be expected to show which types of agreement.

While her analysis has been influential, not all researchers have adopted this approach. In particular, some have argued that the tri-partite division of verbs is not necessary, preferring to collapse the groups. For example, Quadros & Quer (2008) combine person-agreeing and spatial verbs into a single class; while Lourenço & Wilbur (2018) collapse all verbs, eliminating division altogether. As seen in examples (1a) and (1b) above, the loci of person-agreeing and spatial verbs often intersect, potentially giving the impression that these verb types should be collapsed. In (1b), the locus ‘a’ could refer to both a physical location and a human referent – Mary is located in Boston and it is she who drives from there to New York. Would this verb be categorized as showing person agreement with its subject, or only locative agreement with its source and goal? Moreover, even some so-called plain verbs may be signed

at a referential locus (Fischer & Gough 1978; Padden 1990; Costello 2015; Lourenço 2018, among many others) to indicate who participated in which event (2a), or a location in which an event takes place (2b).³ Such ‘localized’ verbs add weight to the possibility that the tripartite division of verbs into classes should be abandoned.

- (2) a. IX_a WORK_a, IX_b PLAY_b
‘She works and he plays.’
- b. CAMERA IX_b LEAVE-ALONE_b
‘Leave the camera there.’
(localized plain verbs)

In this paper we interpret evidence from late learners (previously unpublished data from Berk 2003) discussed in Section 2, and from language emergence (presented in several published works), discussed in Section 3, to argue for maintaining a distinction between the types of verb marking. In particular, we show that person agreement and spatial agreement emerge separately, and thus provide evidence for a distinction. However, since individual verbs may appear with different kinds of marking, the distinction shows up in the morpho-syntax rather than the lexicon. With others, we reject a strict classification of verbs. Instead, we see that verbs participate in different types of agreement, depending on the arguments they appear with. We conclude in Section 4 with some implications for theories of verb agreement.

2 Late learners

Few studies have addressed the status of agreeing verbs in deaf signers who were late learners. Newport (1990) summarized results of a study of adult ASL users whose first exposure to it was ‘early’ (ages 4-6) or ‘late’ (after age 12). This study found that both groups scored lower than native signers on a test of verb agreement production. It is not clear whether spatial verbs were included in the test. Boudreault & Mayberry (2006) also compared adult native signers, late learners whose exposure began between ages 5-7, and late learners whose exposure began between ages 8-13, using a grammaticality judgment task which included agreement verbs. They found that the latest learners scored at about 66% accuracy on these structures, and the

³ Distinguishing between agreement verbs and localized plain verbs is a matter of some debate. On our approach, there is no need to classify verbs; instead, we analyze the types of agreement that verbs display. However, we still make use of Padden’s (1990) distinction based on obligatoriness of agreement: if agreement is not obligatory for a particular verb, the verb is understood as plain, but it may be capable of taking locative agreement. We also adopt Meir’s semantic criterion, limiting person agreement to (transitive) verbs with human subject and object. We have not adopted phonological criteria, since verbs can be specified for body contact yet demonstrate agreement (e.g., ASL TELL, INFORM). We acknowledge that our criteria are not universally shared and that they likely need refinement.

earlier late learners scored at around 74% accuracy. Emmorey, Bellugi, Friederici & Horn (1995) conducted both off-line and online tasks with native signers and adult late learners (exposed to ASL at a mean age of 12 years). This study found that later learners were not sensitive to errors in verb agreement in the online tasks, but they were able to detect errors in an off-line grammaticality judgment task. As before, it is not clear whether spatial verbs were included (even if these studies intended to include only person-agreeing verbs, the classification was less clear before Meir 2002, and continues to be debated).

One study takes a detailed look at the development of production of person-agreeing and spatial verbs by late learners in their childhood. Berk (2003) studied two unrelated children with the pseudonyms Mei and Cal, who were exposed to ASL starting at around 6 years old. Both children started attending a residential school for the deaf, where they were immersed in ASL, at that age. For various reasons, neither had developed any spoken or sign language before their immersion. Berk started recording them regularly around six months after their immersion, and continued for four years.⁴ No information is available about their language use after that time.

Berk's project involved video recording naturalistic interactions between Mei and a Deaf language model, and between Cal and that same model. The Deaf language model worked with the students regularly at their residential school. These recordings were then transcribed and analyzed. A limited number of sessions from three comparison children were also used. Two were native signers: Nat, an age-mate of Mei and Cal at the same school; and Jil, much younger, at approximately the same number of years of ASL exposure. The third comparison child, Les, was exposed to ASL beginning around the age of 3 years, and assessed at around the same ages.

Utterances with a verb were coded extensively for different grammatical aspects. Berk examined the production (or omission) of agreement in person-agreeing verbs which should mark agreement with two arguments which are humans or anthropomorphized characters. She also examined production or omission of agreement in spatial verbs that mark the location of an event or the movement to a location of a theme. Verbs that do not accept person or locative agreement were coded as plain. Berk noted that some verbs occur in different categories depending on their syntactic context, so a particular lexical item (e.g., LEAVE in (2b) above) could appear as a locative-agreement verb but could also be a grammatical plain verb.

Overall, Berk found that all five children were similar in their distribution of verb types: slightly over 50% of verbs were plain, about 40% were spatial, and only about 10% of verbs used were person-agreeing. A similar finding was presented by Quadros & Lillo-Martin (2007), who studied the early verbs used by two children acquiring Brazilian Sign Language (Libras; ages 1;02-2;08) and two children acquiring ASL (ages 1;07-2;04).

Where the groups diverged was in the accuracy of their production of the different types of verb agreement. While Jil and Nat produced no errors and Les produced exceedingly few errors in any agreement type (again replicated by Quadros & Lillo-Martin 2007), Mei and Cal produced a high percentage of errors with person agreement, and relatively few errors with

⁴ For more information about the early language development of Mei and Cal, see Berk & Lillo-Martin (2012).

locative agreement or with plain verbs. Furthermore, the distribution of errors persisted for more than three years in Mei's case (only one year's worth of data were coded for Cal, and he maintained a high level of errors over this period). The results are shown in Figure 1 as percentage of errors for each verb agreement type over the period studied; since Jil and Nat produced no errors in the period of equivalent exposure / chronological age there are no figures for their results.

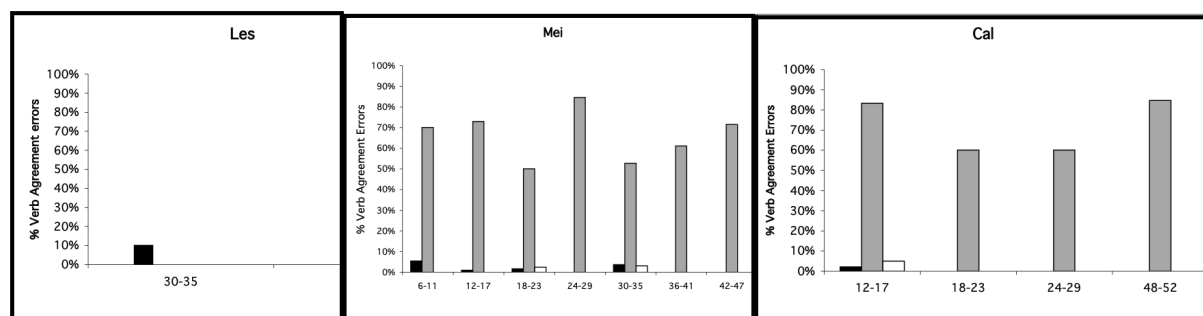


Figure 1. Errors in verb agreement production by three participants (X axis indicates the number of months of exposure at each observation), for three types of verb agreement, expressed as a percent of all verbs produced of that type. Dark bars represent locative-agreement verbs, grey bars indicate person-agreement verbs, and white bars are for plain verbs. Lack of bars indicates no errors during the period observed. Les: early-exposed signer; Mei & Cal: late-exposed signers.

Berk's analysis made it clear that Mei and Cal were quite capable of using the signing space to express locative information with spatial verbs (including so-called localized plain verbs). Mei was noted to use such spatial information even for non-present referents, a skill that is considered later-developing in native signing children (e.g., Bellugi, vanHoek, Lillo-Martin & O'Grady 1988). Thus, Mei and Cal used locative agreement with various loci, whether they were actual physical locations in the world, or loci in signing space representing locations. Some examples of Mei and Cal's accurate use of locative agreement are given in (3).

- (3) a. PUT_a Mei 6;07
'You put it there.'
- b. WRONG_a WALK_b WRONG Mei 6;07
'It's wrong of you to walk here.'
- c. IX(wall) TURN-OFF-SWITCH(wall) IX(you) Cal 6;10
'You turn off the light switch over there.'

For person agreement, however, Mei and Cal frequently made errors, both of omission and sometimes of commission. In an omission error, the verb is produced in neutral space, as a citation form would be (similar to first generation ABSL signers discussed in Section 3.1), without positioning either the beginning or the ending location of the verb at an R-locus associated with a referent. Some examples are given in (4).

- | | | | |
|-----|----|---|----------|
| (4) | a. | TELL[unmarked] BEAR
'Someone tells the bear.' OR 'The bear tells someone.' | Mei 6;07 |
| | b. | NOT-YET GIVEx[unmarked] NOT-YET
'I didn't give you the gift yet.' | Mei 7;03 |
| | c. | IX(children) FEED[unmarked] FOOD
'The children feed the hamster food.' | Mei 9;09 |

Berk's data provides a striking example of the long-lasting effects of delayed exposure to an accessible language. We will return to the question of why person agreement would be particularly subject to age of acquisition effects in Section 4. For now, note that these data provide strong evidence that there is a distinction between person and locative agreement. In the next section, we turn to another source of evidence for this distinction.

3 Language emergence

Over the past few decades, researchers have been able to observe linguistic characteristics of relatively young sign languages in different contexts. These studies have revealed that certain characteristics that had been thought to be found across all sign languages, such as the use of spatial locations for agreement (see Newport & Supalla 2000), are not necessarily observed in the same way for emerging sign languages. Study of language emergence provides another source of evidence that person and locative agreement should be distinguished.

Research on the emergence of the grammatical use of space has consistently adopted the tri-partite system presented in Section 1 above in tracking the development of verb types in 'young' sign languages (Meir, Padden, Aronoff & Sandler 2007; Meir 2010; Padden, Meir, Aronoff & Sandler 2010; Senghas 2010; Meir 2012). Overall, these data reveal that verbs that agree with locations and verbs that encode grammatical person (and number) have separate development trajectories in a language's emergence (i.e., they do not appear 'all at once' - contrary to what one might expect, under the assumption that these verbs are of the same class). The strongest evidence for this conclusion comes from research on Al-Sayyid Bedouin Sign Language (ABSL), to which we now turn.

3.1 ABSL

ABSL, which emerged less than 100 years ago, has been observed to completely lack the grammatical category of person in its verb system (Meir et al. 2007; Meir 2010; Padden et al. 2010). Yet, Meir et al. (2007) observe that ABSL possesses locative marking. As such, ABSL provides substantial evidence that locative agreement develops before person agreement, and that person agreement may never develop at all within a language.

The primary data supporting this claim comes from an elicited production study (Aronoff et al. 2004; Meir et al. 2007). Signers of the second generation were asked to describe short video clips depicting actions of a single referent or between two on-screen referents, including 11 cases of transfer between two entities. Since the elicitation involves describing actions of others, no first-person forms or present referents would be included. The authors found that verbs that typically denote transfer (and would, thus, be categorized as agreement verbs in other sign languages) behave like plain verbs (i.e., direction of movement is restricted to their own central plane). ABSL signers strongly prefer to use the Z axis (away from or toward the body) for verb movement: verbs such as GIVE, THROW, and FEED move away from the body, while verbs for which the subject is a goal ('backwards' verbs), such as TAKE and CATCH, move toward the body. The signers rarely vary direction from side-to-side (along the X axis), which is typically employed for two third-person subject/object arguments of person-agreeing verbs in established sign languages like ASL. As such, ABSL verbs have been argued to not encode person distinctions (Aronoff, Meir & Sandler 2004; Meir et al. 2007).

In a further study comparing younger 3rd generation (16-25 years old) to older 2nd generation (28-45 years old) signers, younger signers used the X axis 50 percent more than older signers. However, the overall pattern showed a preference for the Z axis for both groups (Padden et al. 2010). Moreover, it was found that when younger signers did use the X axis it was used more with spatial verbs (denoting actions such as a ball rolling, a man putting a book on a shelf, or a woman walking) rather than 'transfer'/person-agreeing verbs. Padden et al. (2010) argue that this preferred usage of the X axis with spatial verbs supports the hypothesis that locative marking develops earlier than person marking. Our interpretation of these findings is that incorporation of spatial marking into the grammar of an emerging sign language occurs more readily than incorporation of person marking.

Further evidence comes from the fact that neither younger nor older ABSL signers established R-loci 71 percent of the time during elicitation (Padden et al. 2010). Without establishing abstract loci, only present referent locations can be used in agreement, but since the elicitation involved describing events seen on a video, abstract loci would be required. When ABSL signers did establish R-loci, the subject R-locus was typically established near the signer's body and the object R-locus was established further out along the Z axis. Padden et al. (2010) describe this use of the Z axis for establishing third person subject and object referents as 'emergent agreement'. Nonetheless, they conclude that the consistent and preferred usage of the Z axis, with the site of/near the signer's body as subject, supports the idea that encoding subject takes primacy over encoding person. In turn, this further supports the idea that ABSL lacks person agreement.

In sum, ABSL serves as a key example of a language that can manipulate space/path of movement to encode locations and motion, while lacking this same manipulation of space for other (more abstract) purposes like encoding grammatical person. We can, thus, deduce that while locative and person agreement verbs have similar properties and often intersect, they are clearly not one and the same.

3.2 ISL

There is a similar pattern with Israeli Sign Language (ISL), especially when comparing the oldest of ISL signers to younger ones (Meir 2012). Like ABSL, ISL is considered a young language, with four known generations of signers (at the time of study), including the very first generation of signers who contributed to its emergence and development (Meir 2012; Meir et al. 2007; Padden et al. 2010). According to Meir and her colleagues, this first generation of signers (65 years old and older) are similar to ABSL signers in consistently lacking verb agreement for person. Only younger signers in their 30s and under were said to use a full person agreement system of inflecting for both subject and object. Taken together with the evidence from ABSL, this path of development exemplifies that person agreement emerges *gradually* over time - it requires at least two-to-three generations of signers for such a system to develop.

This gradual development becomes even clearer when comparing the use of the Z (center-out/center-in), the X (side-to-side), and the Z+X (diagonal out to a position to the right or left) axes among signers. Using the same video stimuli clips from the ABSL study, Padden et al. (2010) found that the youngest ISL signers (30-40 years old) used the Z axis the least (25 percent) and the X axis most extensively (42 percent), compared with older generations who extensively used the Z axis for most responses. Specifically, they found that the two older groups of ISL signers (45-65 years old / 65-90 years old) used the Z axis for 60 percent of their responses compared to less than 30 percent with the X axis. In addition, using diagonal movement (Z+X axis) became significantly more prevalent with the youngest group. Overall, the two older groups preferred the Z axis, much like ABSL signers, while the youngest group does not exhibit this preference.

When examining the use of axes with regards to verb agreement types, the pattern continues to mirror that of the ABSL signers. The two older groups consistently preferred the Z axis for both locative and person-agreeing verbs, and showed an even greater preference for using the Z axis with person-agreeing verbs than locative marking verbs. Nevertheless, the 45-65 year old group differed from the 65-90 group in showing greater use of the diagonal Z+X axis (21 percent vs. 7 percent respectively). What is even more intriguing is that this diagonal use of space (in the 45-65 group) was employed more often for person-agreeing verbs than for spatial verbs - signifying a gradual shift towards representing third person referents away from the signer's body. The youngest group (30-40) showed the most different patterns in their axis usage with verb types, marking verbs for agreement 75 percent of the time. In contrast, the two older groups showed the opposite pattern of *not* marking agreement for more than half of the forms observed in the study.

In consequence, ISL further bolsters the notion that spatial and person agreement do not emerge simultaneously. As Padden et al. (2010) observe, despite being afforded a three-dimensional signing space and despite the iconic nature of the path of movement in verbs of motion and transfer, during a language's incipient years signers prefer the center-out/ center-in Z axis. Moving away from the body and using other points in space for grammar is not as intuitive as one might expect; and as such, developing a rich agreement system that exploits space and path of movement to its full extent takes time to develop. And along this path of

grammaticalization, using space to encode locative information seems to emerge before using space to encode grammatical person. Why this might be the case is explored in Section 4. First, however, we turn to a brief discussion of another emerging sign language, Nicaraguan Sign Language (NSL).

3.3 NSL

Another emerging language that offers an opportunity to tease apart spatial and person agreement is NSL. In fact, Senghas (2010), at first glance, appears to address this exact issue in asking if what she calls the more abstract *who* construction (i.e., expressing the participants of an event) and the more iconic and concrete *where* construction (i.e., describing locations and orientations of referents) can be reduced to a single construction, or if the former is derived from the latter. The results of her (and her colleagues') work indicate that the more abstract construction actually conventionalizes first and is not derived from its concrete counterpart - apparently contra the argument presented in this paper.

However, it turns out that Senghas' work does not discuss the same contrast we are concerned with. With respect to the *who* construction, although Senghas uses the term 'spatial modulation' rather than person agreement, she is clearly discussing the phenomenon we call person agreement. In describing this phenomenon, she states that, "Nouns can be associated with particular locations in the signing space; verbs then 'agree' with their noun arguments by incorporating these same locations in some way, such as beginning or ending the verb there" (291). Such a description suggests that she is, indeed, examining person agreement. However, Senghas' description of the 'more iconic' *where* construction does not match up to the concept of locative agreement as understood in this paper. What she refers to as 'locative marking' involves "...descriptions of physical spatial relations among objects, indicating *where* things are" (291). This description indicates that we are not dealing with verbal forms per se, but rather with the ways in which signers describe the (static) location of entities/nouns. Senghas does not discuss the kind of verb that shows through its movement the path of a movement event. Thus, the results she presents do not directly address the concerns of this current paper.

Nonetheless, in earlier work, Senghas and her colleagues have shown that 'spatial modulation' takes some time to emerge and requires at least two sequential cohorts of signers to develop consistent use of referential space (Senghas & Coppola 2001). In fact, first-generation NSL signers have been said to rely on word order to indicate arguments (Senghas, Coppola, Newport & Supalla 1997). Not only that, all signers of that generation used single argument predicates, even when shown stimuli with two animate participants (e.g., MAN PUSH, WOMAN FALL). Meir (2010) similarly found that the earliest generations of ISL and ABSL signers showed strong preference for single argument clauses, in order to "avoid" argument marking. Evidently, both complex argument structure and agreement are not immediately available amongst those creating a new community language (however, see Coppola 2002 for evidence that homesigners display complex argument structure).

4 Implications

4.1 Why locative before person agreement?

Given all the empirical evidence presented above, it is now time to focus on *why* locative agreement precedes person agreement (both in language development and in language emergence). It is important to point out that we are not claiming that signers of emerging languages prioritize spatial marking because they are themselves late learners. Rather, we think that late learners and emerging languages may have a deeper reason for this similarity.

Padden et al. (2010) and Meir, Sandler, Padden & Aronoff (2013), expanding on Meir et al. (2007), present one possibility for answering this question. They argue that *competing iconicities* may explain why using space for grammatical person may take longer to develop. Meir et al. (2007) propose that the signer's body is not merely a formal location for articulation, but also serves the function of representing the subject argument, a notion they call 'Body as subject'. Meir et al. (2007) argue that for body-anchored verbs (e.g., EAT and DRINK), as well as other plain verbs signed on/near the body, such as verbs for mental activity (THINK), psychological states (LOVE), and of saying (ASK), the body is naturally associated with the subject (rather than a particular thematic role). As such, the iconicity of using the body as subject and the iconicity of the signing space for representing grammatical person are in competition. Achieving the latter means moving away from the body and dispensing with the subject always being oriented as the signer's body (as in the case of third person subjects). Such a task is difficult since, as Meir et al. (2007) argue, "iconic use of the body as subject emerges very early in the life of a sign language and remains a significant factor in the signing of plain verbs" (590). On the other hand, when it comes to locative marking on spatial verbs that generally do not involve animate arguments (e.g., a ball rolling from one location to another), this 'competition' is less strong. With an inanimate subject, the iconicity of the body as subject is not as powerful, allowing the iconicity of the signing space to win out. In consequence, locative agreement develops more readily than person agreement, and can be later extended to cases with an animate subject.

Berk (2003) takes a different approach to explaining the contrast between person and locative agreement. She argues that locative agreement involves interpretable semantic features carrying a semantic contribution, while person agreement involves uninterpretable features which are strictly formal. She hypothesizes that delayed linguistic exposure is more likely to affect formal features than semantic features, although she does not provide an explanation for why the difference lines up this way, other than a suggestion that semantic features are connected with the real world and hence more accessible.

On our view, along with many others (e.g., Rathmann & Mathur 2002, 2008; Lillo-Martin & Meier 2011), person agreement necessarily involves phi-features including [person]. However, locative agreement used with spatial verbs does not include [person] features. As Padden (1983/1988) and Janis (1995) have shown, the R-loci associated with person agreement and locative agreement function differently; for example, movement toward (though not reaching) a locus can be interpreted as full person agreement, but with spatial verbs the same

movement trajectory can be interpreted as representing a different (part-way) spatial endpoint. In our view, locative agreement emerges before person agreement because it entails the use of loci to represent (concrete) space. Person agreement, on the other hand, involves abstract grammatical features (especially, the first vs. non-first person distinction), that take time to develop.

4.2 Grammaticalization path

We have argued that language development and emergence data make the case that locative agreement comes before person agreement in sign languages, and that this is because phi-feature agreement on verbs emerges later. Let us compare this proposal to the path of grammaticalization from gesture to grammar proposed by Pfau and Steinbach (2006), as shown in Fig. 2.

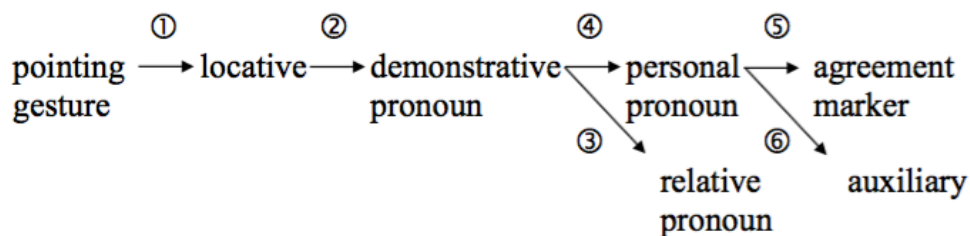


Figure 2. Grammaticalization path from gesture to agreement proposed by Pfau & Steinbach (2006).

Given that personal pronouns are the most common source of agreement markers in spoken languages (Heine 1993), Pfau and Steinbach (2006)/Pfau (2011) argue the same developmental trajectory for sign languages. Previous work analyzing sign language agreement has also argued that agreement makers on verbs are, in fact, pronominal affixes (Keller 1999, Wilbur 1999) or clitics (Nevins 2011). Moreover, Pfau (2011) further speculates that pronouns are a prerequisite for agreement, citing as support the fact that third cohort NSL signers used both nominal pointing and spatial modulation more consistently than older/earlier cohort signers (Senghas & Coppola 2001; Coppola & Senghas 2010). He, thus, speculates that those who use spatially modulated verbs also use pronominal forms, while the opposite is not true. Pfau (2011), however, cautions that data must be reassessed to verify these claims.

Likewise to our argument for agreement, Pfau (2011) argues that pointing to locations is concrete and appears closest to its gestural root in the grammaticalization chain. Agreement markers (and auxiliaries) emerge latest, as the most grammatically abstract devices. Pfau & Steinbach’s (2006) grammaticalization path is, thus, on par with other paths described in the language evolution literature (Heine 1993; Bybee et al. 1994; Heine & Kuteva 2001): abstract grammatical concepts develop from more concrete concepts.

It is important to note, however, that in discussing agreement marking, Pfau (2011) strictly refers to person agreement, and provides no discussion of locative agreement. By “locative” (Stage 2), Pfau and Steinbach (2006) strictly refer to locative *pointing*. As such, one is left to wonder where locative agreement would fall under their paradigm. One proposal is

that locative agreement develops alongside demonstrative pronouns, as in Figure 3. As use of locations becomes more abstract, we see the development of proximal locatives ('here') and distal locatives ('there'). It is not difficult to imagine that once these have been established, movement between locatives (from 'here' to 'there') may be the next step in the chain.

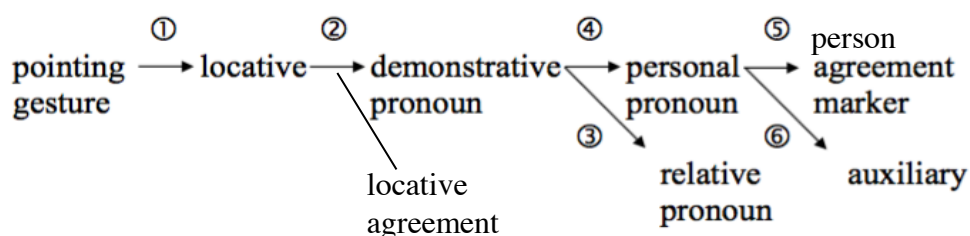


Figure 3. Modification of the grammaticalization path proposed by Pfau & Steinbach, to include locative agreement as distinct from person agreement.

Thus, in Figure 3, we should anticipate that phi-features emerge after locative agreement, with the development of personal pronouns. This then serves as the next step towards person marking. Data presented in this paper, along with those in Pfau (2011), support this prediction – concrete use of space always precedes grammatical use of space. Locative pointing and agreement, being grounded in real world locations, should appear earliest in emergence, with pronouns and person agreement appearing last alongside the development of abstract grammatical categories. Such a hypothesized path illustrates the contrast between locative agreement and person agreement that we have stressed.

4.3 Implications for current theories of verb agreement

Lastly, we would like to present two considerations concerning current theories of verb agreement: 1) a featural distinction between person- and locative-agreeing verbs; and 2) the need to account for locative agreement, which has been mostly ignored in the literature.

Sign languages have been described as ‘unique’ in having a subclass of verbs that can express agreement. Meir in her seminal 2002 paper, like many others, attempts to address this issue by integrating lexical-semantic structure (Jackendoff 1990) into her theory of ISL. More recently, researchers have attempted to move away from the lexically specified, tri-partite verb classification system (Padden 1983/1988) in pursuit of situating a theory of sign language agreement within the broader theory of agreement as we understand it in spoken languages. As previously mentioned, some have argued for collapsing person and locative agreement verbs into a single class (Quadros & Quer 2008), while others have attempted to eliminate lexical division altogether (Lourenço & Wilbur 2018). Meanwhile, some claim that verb agreement in sign languages can be purely derived from modality-independent syntactic mechanisms (Pfau, Salzmann & Steinbach 2018), minimizing the discrepancies we observe across modalities. While these and other theories have been useful in furthering our understanding of the verbal systems of sign languages, many have failed to account for the empirical differences between

locative and person agreement. Moreover, they have failed to consolidate what we know about verb agreement in emerging languages and delayed language acquisition.

Firstly, are plain, spatial, and person-agreeing verbs actually non-distinct? Lourenço & Wilbur (2018) argue that [location] is the ‘true morphological realization of agreement’ across all verbs in Libras and other sign languages. While other authors have described agreement by referencing the loci between which an agreeing verb moves (see Sandler & Lillo-Martin 2006), it is often the case that it is the directionality of the movement which is considered the key component of agreement (Mathur & Rathmann 2012). In contrast, Lourenço & Wilbur (2018) argue that agreement should be viewed as *co-localization* – the sharing/matching of location features between a controller (nominal) and its target (verb), without distinguishing between verb types. They support this theory in part by considering localizing plain verbs, introduced in section 1 above (cf. Fischer & Gough 1978): the fact that some so-called plain verbs can be signed at the locus of an argument (see examples in 2 above). As such, they claim that these plain verbs can also express agreement, minimizing the distinction between plain and agreement verbs. Verbs that never express agreement are accounted for by phonological restrictions; i.e., they are ‘body-anchored’ verbs already specified for a location on the signer’s body (see Oomen & Kimmelman 2019 for an agreement analysis of body-anchored verbs). Consequently, Lourenço & Wilbur’s proposal is highly attractive in the treatment of agreement as not exclusive to a subset of verbs.

However, their argument makes no reference to phi-features. While their derivations include phi-probes on T and v, they do not discuss their featural content or valuation; only location is valued. As such, we are left to assume that there is no featural distinction among the verb types. This would leave unaccounted for the distinction between person and locative agreement we have discussed. Also, Pfau et al. (2018) provide additional arguments against collapsing the locative and person-agreeing categories. There are a number of additional issues in eliminating the distinctions between verb types, including the interpretation of null arguments. Recently, Oomen & Kimmelman (2019) argued that with body-anchored verbs in Russian Sign Language (RSL) and German Sign Language (DGS), a null subject can only be interpreted as first-person; third-person interpretation is only available in the case of an overt subject. Moreover, with person-agreeing verbs null arguments lack this person restriction. A theory based solely on locational features would not be able to explain these interpretation patterns found in these two sign languages (although not in some others). As such, we contend that a distinction between locative and person-agreeing verbs must be maintained, or at least a distinction between their featural profiles.

Secondly, spatial verbs have not received as much attention as other verbs in the recent agreement literature. Meir’s (2002) analysis proposed both similarities and differences between the two types (summarized in section 1), while some older studies emphasized the differences between them (Padden 1983/1988, Janis 1995). However, recent proposals either focus on person-agreeing verbs (Pfau et al. 2018) or explicitly attempt to collapse person- and locative-agreeing verbs (Quadros & Quer 2008, Lourenço & Wilbur 2018), but they do not propose syntactic derivations that show how agreement with subject/object and agreement with locatives can be unified.

Overall, we agree that both Lourenço & Wilbur (2018) and Pfau et al. (2018) present viable implementations of verb agreement in sign languages. Further research is needed on how locative agreement can be syntactically derived, potentially employing mechanisms such as the ones they proposed, but maintaining the necessary featural distinction. Verb agreement continues to be a controversial topic in the sign linguistics community, due to the sometimes subtle distinctions between verbs and also the overlapping qualities we see across the verb types. Moving forward, proposals must tackle both issues, and also consider evidence from language development and emergence. In doing so, we may come to a more fine-grained understanding of verbs in sign languages that does not rely on lexical specification, but on featural differences or derivational constraints.

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