

Gesture and the Acquisition of Verb Agreement in Sign Languages

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In this paper, we investigate the acquisition of verb agreement in Brazilian Sign Language (LSB) and American Sign Language (ASL), by deaf children learning sign language as a native language from their deaf, signing parents. Previous studies have found that such children go through a period with numerous errors of omission of agreement in obligatory contexts, and that the use of agreement in verb signs is related to the use of ‘directionality’ in early gestures. However, the children in our study produced almost no errors of omission or commission, and they used directionality in gestures together with agreement. We conclude that conventional communicative gestures complement language in sign languages as well as in spoken languages, and that a different view of the environments for obligatory agreement lies behind the contrasting results.

1. Sign language verb agreement

LSB and ASL (like most sign languages) have three types of verbs, which vary according to whether or not they are modified to indicate verbal arguments, and if so, which ones. The description of verb agreement used here is a modification of that proposed by Meir (1998, 2002). Verbs indicate their arguments by the direction of their facing and by their initial and final locations in signing space. Locations in signing space can be associated with person or locative referents. Then, *person agreeing* verbs (generally verbs of transfer) face their objects, and move from the location associated with their (+human) subject to the location associated with their (+human) object. *Spatial* verbs (verbs of movement and location) move from the location associated with their source

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argument to the location associated with their goal argument. *Plain* verbs do not require modification to indicate subject or object, although they may optionally be signed in a location indicating the location of the event.

This modification of the location and movement of verb signs is known as verb agreement, and is illustrated in Figure 1. (See also Padden 1988[1983]).

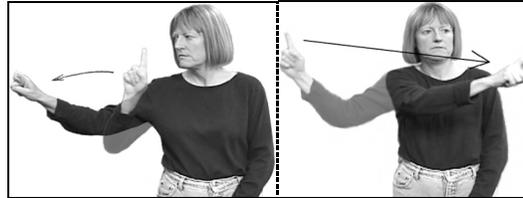


Figure 1. Verb agreement in ASL a. I-ASK-HER b. SHE-ASKS-HIM

2. Previous studies of verb agreement acquisition

Many studies have shown relatively late acquisition of agreement in ASL and other sign languages. For example, Meier (1982) conducted a longitudinal study of spontaneous production data from three children (ages 2;0-3;8) acquiring ASL as a native language. While he found some verb agreement used in the earliest sessions, the children did not show a high proportion of correct use in obligatory contexts until around the age of 3;0, and errors of omission continued to occur until well after age 3. In addition, occasional errors of commission were also found, when children produced agreement on plain verbs.

Morgan et al. (2006) found similar results for one child acquiring British Sign Language, and other authors have also observed periods during which children use agreement only some of the time they should.

3. Contrary findings

In order to explore in more detail the contexts of use and non-use of verb agreement, Quadros, Lillo-Martin & Mathur (2001) conducted a longitudinal study of verb agreement acquisition by two children learning ASL (Jil and Sal) and one child learning LSB (Ana). These children were all exposed to sign language from birth by their deaf, signing parents. The data analyzed in this study are characterized in Table 1.

**Table 1. Analyzable utterances with a verb
(Quadros, Lillo-Martin & Mathur 2001)**

Age	Ana	Jil	Sal		Age	Ana	Jil	Sal
1;8	15				2;3	64		35
1;9		21	58		2;4	34	89	
1;10	29	117			2;5	38		
1;11		65			2;6	38		
2;0	21	55	63					
2;1	13				2;10	49		
2;2	9	57						

Unlike other studies, Quadros et al. (2001) found that the children's verbs were rarely missing obligatory agreement. Although overall, plain verbs were used more frequently than inflected verbs (and thus the contexts for obligatory agreement were relatively few), correctly inflected verbs were used by all children at every age. Berk (2003) independently coded different sessions from Jil, and also found virtually no errors of omission or commission.

This leads us to wonder, why do Quadros et al. and Berk find almost no errors of verb agreement (omission or commission), while others find a protracted period of acquisition? Are there differences in the classification of verbs or environments for obligatory agreement? Are there other factors that influence children's use of agreement (or researchers' observations of it)?

4. Verb agreement and gesture

Casey (2003a, b) conducted a study of the acquisition of verb agreement in six children acquiring ASL. She found that agreement was used in signs as early as 1;11, and that it continued to be used with a variety of verbs, although a high percentage of correct use in obligatory contexts did not reach ceiling until after age 2;6.

Casey compared the emergence of agreement in verbs with the use of 'directionality' in early gestures. The gestures she looked at included the common reaching gestures used by hearing and deaf children to communicate 'want/give-me' or 'pick-me-up', and iconic emblems such as 'bring-here'. She found that directionality in gestures was used at a very early age (0;8 - 1;0), prior to agreement in signs (1;11). She argued that agreement in verbs and directionality in gestures are similar in that both are used to indicate referents, marking a variety of 'verb arguments'. Furthermore, errors in signs mimic the use of directionality in gesture. Because of these factors (and others), Casey proposed that verb agreement emerges from the directionality used in gestures.

This proposal led us to consider the use of gestures in our own study of the acquisition of verb agreement. It is important to recognize which types of gestures are involved. Some, like the reaching ‘want/give-me’ gesture, are produced by deaf and hearing children, but not used (generally) by adults. Others, like the ‘bring-here’ example, are used by both children and adults. In fact, such gestures are sign-like in many ways, but aspects of their formation are different from signs, and native signers do have intuitions that they are gestures rather than signs.

In their paper, “The cataclysmic break between gesticulation and sign,” Singleton, Goldin-Meadow & McNeill (1995) argue that *gesticulation* (including beat, metaphoric, and iconic gestures) is radically separate from the signs of an established sign language. However, *emblems*, which are culturally developed and often used much more consciously, are rather close to the signs or words of a language on this continuum. Emmorey (1999) claimed that “the manual gestures that occur with signing tend to be more mimetic and conventional than the gestures that are concurrent with speech” (p. 147).

It is these gestures on which we focus: child-like reaching gestures and adult-like emblems. It is possible to ascribe a limited range of meanings to a particular form, although which meaning is intended may be determined only by context (e.g., ‘stop/stay/leave it’). The same forms are associated with the same meanings within a community, but they may be different from one community to the next (e.g., the forms used for ‘stop’, ‘wait’, and ‘no’ are distinct in Brazilian vs. American cultures). In addition, the movement patterns of these gestures or emblems are different from those of established signs.

5. The present study

For the present study we conducted an analysis of verb agreement acquisition using longitudinal spontaneous production data from two more children: one (Aby) acquiring ASL, and one (Leo) acquiring LSB (both with deaf, signing parents); along with (re)analysis of data from Sal and Ana. The data sessions analyzed are presented in Table 2.

In order to identify where agreement should be considered obligatory, we considered verb type and sentence/discourse context; we consulted extensively with native signers; and we examined adult data from one session each for Aby and Leo. In addition, we counted the occurrence of gestures and emblems, and coded them for their use of ‘directionality’.

Table 2. Analyzable utterances with a verb (present study)

Age	Leo	Ana	Aby	Sal
(1;2-) 1;7		23		14
1;8		16		67
1;9	56	4		117
1;10	17	6	35	
1;11	34	18		
2;0	25	8	30	
2;1	69	27	84	
2;2	121	9	48	
2;3	79	38	104	92
2;4	92	24	91	
2;5	110	21		
2;6		36		
2;7		24		
2;8		23		

5.1 Analysis 1

Our first analysis concerns the types of verbs used and the presence of agreement. We divided the verbs into the following types:

Verb categories

Plain: No agreement used or required

Person agreeing: Transitive or ditransitive transfer verb, [+human] object (overt or understood) in context

Location agreeing: Verb of movement or location, movement indicates path or location indicates location

Classifiers: Handling, SASS, semantic (usually marked with locative agreement)

Only object agreement on verbs of transfer with [+human] objects is considered obligatory (cf. Padden 1988[1983] and others on the optionality of subject agreement). Object agreement may be indicated by facing only, with a short movement path toward the object, or with a long path from subject to object. In fact, we found that facing was the only indicator of agreement in some cases, but only in imperative contexts. Verbs which may optionally be signed in a location (e.g., WANT) are considered plain verbs when no agreement is used, and are combined with location agreeing verbs when they are so marked. We relied on the judgments of native signers as to whether locative agreement could

be omitted in particular cases. For example, when her father asked Sal (1;9) where her mother was, she signed GO FOOD STORE ('She went to the grocery store') with no locative agreement marking on GO. Although GO can be signed with locative agreement, this was judged to be an acceptable omission, so GO was coded as a Plain verb for the present analysis.

The results are summarized in Figure 2. Leo and Ana (LSB) are shown in the top part, while Aby and Sal (ASL) are shown in the bottom part. The number of analyzed verbs at each age range is given in parentheses. The overall pattern is quite similar across the four children. Plain verbs were the most commonly used. Person agreeing verbs were infrequent but correctly marked, with virtually no errors. Locative agreement was productively used. Overall, at most a few errors were made by each child across all verb types. It is clear that in these respects the current results replicate those of Quadros et al. (2001).

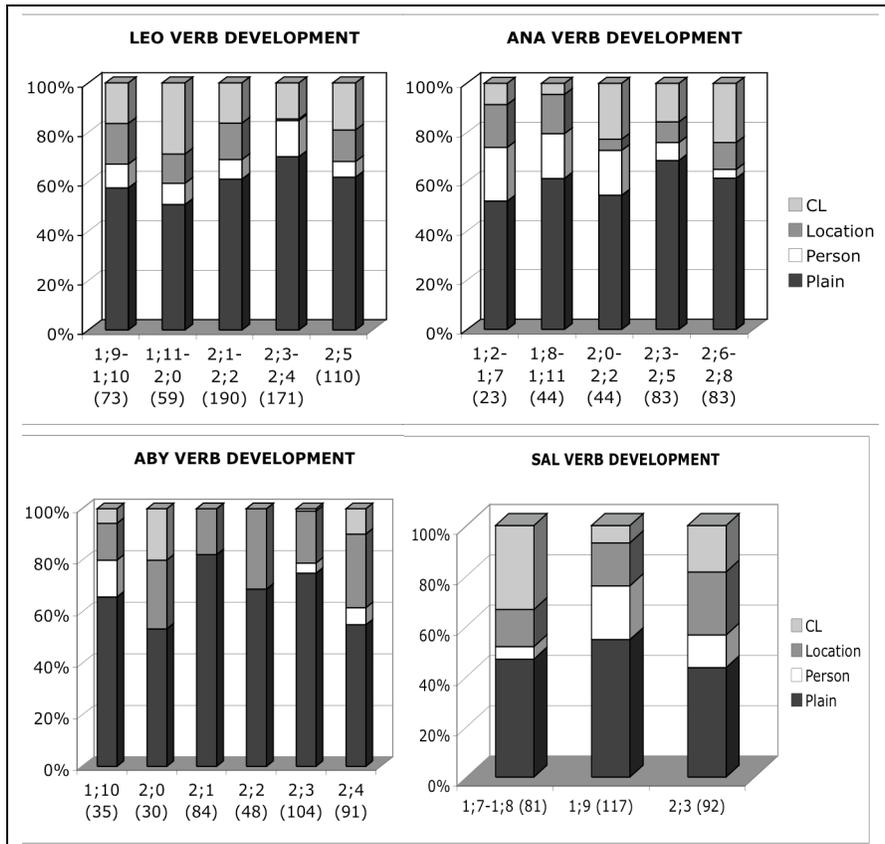


Figure 2. Results of Analysis 1: Verb types over time

Examples of inflected verbs used by Leo and Aby and example utterances are given in (1)-(2).

- (1) Leo's inflected verbs include COME, GET, PUT-IN, GIVE, BRING
 (2;1) <you>COME<here> PRAY BLESSING PRAY IX<picture>
 'Come here, we will pray for blessings.'
- (2) Aby's inflected verbs include FEED, GIVE, PICK-UP, PUT, GO
 (1;10) REMOTE-CONTROL IX<there>...
 MOTHER, <I>GIVE<mother> IX<remote-control>.
 MOTHER, <I>GIVE<mother> IX<mother>, <I>GIVE<mother>
 'I will give the remote control to mother, I will give it.'

5.2 Analysis 2

For the second analysis, we coded the adults signing with Leo and Aby (generally Mother or experimenter) for verbs in the same manner as the coding of the child signing. The sessions analyzed were as follows:

Leo (2;1): 87 utterances
 Aby (2;0): 78 utterances

We found that the distribution of verb types in the input is very similar to that used by children. Most of the verbs are plain. However, a notable proportion of the verbs used in the input do have agreement, and overall the input contains more person agreeing verbs than the children use. In addition, the input shows the same variability in forms of agreement (according to verb type, and context) found for children.

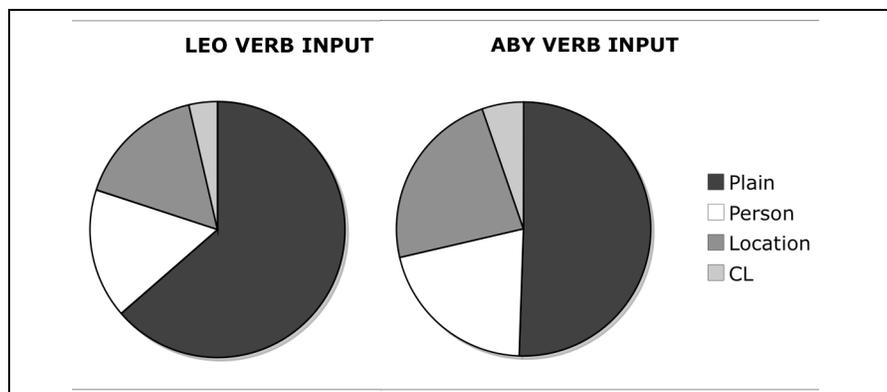


Figure 3. Results of Analysis 2: Verb input types

5.3 Analysis 3

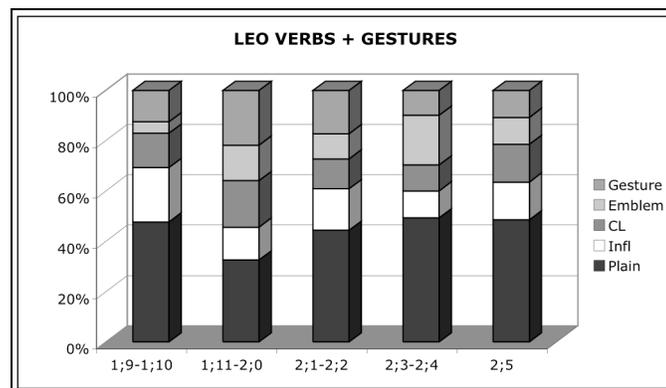
The third analysis examines the relationship between gestures and verbs. The types of gestures included are communicative, gestural ‘predicates’ of the following types:

- Emblems: ‘wait-a-minute’, ‘wave-no’
- Locating gestures: ‘sit-here’, ‘put-here’
- Reaching gestures: ‘gimme’, ‘want’

We did not include pointing or deictic gestures, nor movements related to agitation or other emotional states, attention-getting movements, or object manipulations.

In order to determine whether a candidate was a gesture or a sign, we relied heavily on the intuitions of native signer analysts. We generally counted as emblems those candidates which have the same form and meaning as emblems in the surrounding hearing community (following Volterra 1981; Volterra & Erting 1994). We also observed that the movement characteristics of gestures and emblems are not sign-like. For example, in some cases the movement of an emblem is at the wrist only, while the movement of a related sign is at the elbow. A more detailed investigation of the movement characteristics of signs vs. gestures and emblems will await further research.

The results from Analysis 3 are presented in Figure 4. We found that gestures and emblems constitute about 1/4 of the children’s ‘predicates’ (combining gestures, emblems, and verbs). These gestures are often marked with ‘directionality’, as Casey (2003) found.



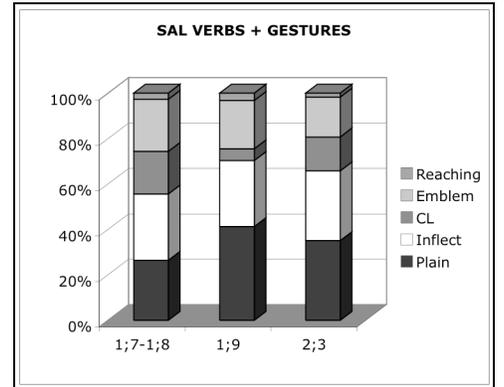
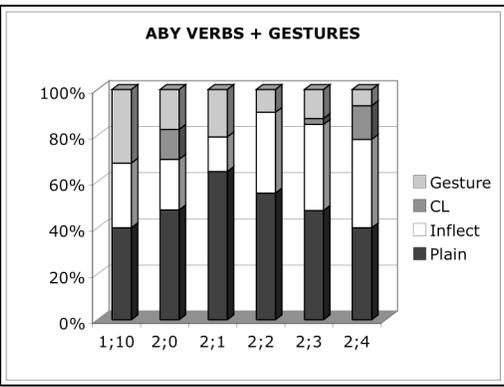
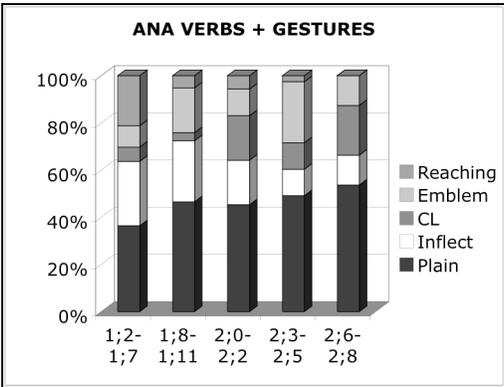


Figure 4. Results of Analysis 3: Verbs and gestures

Given the number of gestures and emblems produced by the children, we asked whether they are substituting for agreeing verbs, particularly the person agreeing verbs which are used relatively infrequently. If so, we expected to see (a) many gestures with meanings of agreeing verbs; and (b) a different pattern of gesture use as compared with non-signing children.

We found that gestures and emblems correspond to all types of verbs – not just agreeing verbs. The gestures and emblems are very similar to those used by hearing children. Importantly, children often use gestures to convey meanings for which the sign is known (SIT / ‘sit’; GIVE / ‘gimme’; COME / ‘come’). In fact, the gestures/emblems may well be used in sequence with verb signs, as illustrated in (4).

(3) Leo
Gestures / emblems used include ‘gimme’, ‘go-away’

(4) Aby (2;3)
<you>GIVE<me> ‘gimme’
‘move-over’
IX<object> WANT
‘Give me that! Gimme! Move over, I want it!’

Aby (2;1)
‘sit-here’ SIT ‘sit-here’
‘Sit, sit here (on the chair).’

We found that at this age, gestures are complementary to signed verbs – NOT substitutes for unknown or difficult verbs (such as person agreeing verbs). Signs and gestures contribute differentially to communication, in a way similar to the way that spoken words and gestures combine (Goldin-Meadow 2003). The role of gesture appears to be to supplement language, whether that language is signed or spoken. This is so even for very young signing children at the beginning of syntactic development.

6. Why So Few Agreeing Verbs?

If we cannot explain the low frequency of agreeing verbs by appealing to the presence of gestures, what does explain this? We find that an explanation can be suggested by considering the typical verbs used by young children. We suspect that the most frequent verbs in young children’s utterances are simply the type which do not require agreement.

To test this, we examined the verbs used by two hearing, English-speaking children between the ages of 1;6 and 2;6. We examined the corpora for Naomi (Sachs 1983) and Peter (Bloom et al. 1974, 1975) in the CHILDES database

(MacWhinney 2000). We listed all verbs that appeared more than twice in each of two six-month periods (1;6-1;11 and 2;0-2;6), and characterized each verb type as to whether it would most likely be signed using a plain, person agreeing, location agreeing, or classifier verb. Many concepts have various alternate signs, so the exercise is imprecise. However, it is revealing. The results of this analysis are presented in Figure 5.

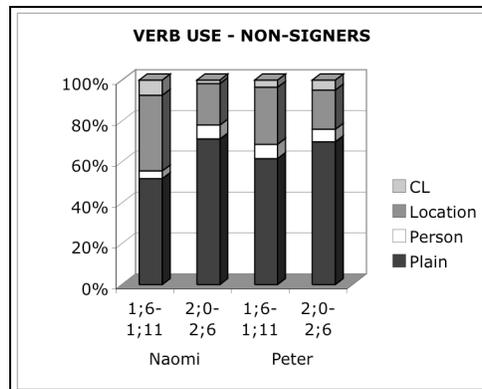


Figure 5. Verb use by hearing, non-signing children

If the classification of Naomi's and Peter's verbs is accurate, this indicates that the distribution of verbs found in the signing children is most likely due to their meanings rather than their status as agreeing or plain. Verbs which typically require person agreement (e.g., SHOW, HELP) are simply less frequent in two-year-olds' sentences than plain or locative ones.

7. Conclusion

A range of studies indicates that signing children use agreement for person and location from an early age – before two years. On our analysis, the children we studied did so with very few errors, although the contexts requiring agreement may be limited in number. The difference between our results and those of others showing protracted periods of omission of obligatory agreement may be due to differences in defining which verbs require agreement and in which contexts. Further comparisons are needed to establish this.

In addition, we find that signing children use conventional gestures and emblems to complement their language in ways similar to hearing children. Emblems are conventional, show directionality, and are thus very close to established signs. Further studies comparing signs and emblems might help to identify the movement and other differences between them.

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