

Evidence for Early Word Order Acquisition in a Variable Word Order Language

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Children acquiring languages with variable word order have a complicated task ahead of them. Not only must they learn the underlying word order by correctly setting the word order parameters, they must also learn the syntactic operations that will allow them to derive variant surface orders. This study examines the spontaneous production of deaf children acquiring American Sign Language (ASL), a variable word order language. Their early sign combinations suggest that by the age of 28 months, they have correctly set the word order parameters and are already well on their way to acquiring the morphosyntactic structures underlying the variant orders of their target language.

1. Background

All languages presumably have a basic or underlying word order, regardless of surface order variability. Within a principles and parameters approach, the basic word order is determined by the settings chosen by a particular language for the spec(ifier)-head and head-complement parameters.¹ Some languages, such as English, are labeled as strict word order languages and rarely stray from the basic word order. ASL, on the other hand, is a variable word order language. Although ASL and English both have the basic word order SVO, this is only one of several surface orders available in ASL. While it is possible that these variant orders are all individually base generated, I prefer the view that they are derived from the underlying order via syntactic movement. Not only is this view more simple, it is consistent with native signers' intuitions of SVO as the most unmarked and pragmatically neutral word order, as well as the order found in questions and embedded clauses.

Past studies on the acquisition of English report that children use the basic word order from their earliest word combinations with "trifling few" errors (Brown 1973, Bloom 1970). This has led to the general impression that word order is among the earliest aspects of language to be acquired. If this is so, then

English-speaking children correctly set their word order parameters to yield the specifier to the left of the head and the complement to the right early in the acquisition process. At this point, because English has little word order variation, the child has already accomplished the bulk of word order acquisition. However, a child learning ASL is exposed to various word orders, of which the underlying order may not even be the most common. Correctly setting the word order parameters is not sufficient; the child must also learn the order-modifying operations which yield the various surface orders. It is therefore reasonable to speculate that the process of acquiring adult word order in this situation may be quite different from the acquisition pattern observed in English.

2. Acquisition of word order in ASL

Previous work on the acquisition of word order in ASL is sparse and contradictory. In a study of three deaf children of deaf parents, Hoffmeister (1978) reports consistent use of SVO order, to the exclusion of variant orders found in adult ASL. Such rigid dependence on a single word order may represent a point at which children have set their word order parameters, yielding the underlying word order, but not yet learned how to vary that order. I refer to this as the basic word order stage. This strategy has been reported for children learning other languages with variable word order such as Russian (Slobin 1966, Snyder and Bar-Shalom 1998) and Korean (Park 1970). Largely based on Hoffmeister's findings, Newport and Meier (1985) categorize word order as the only aspect of ASL acquired both "early and without error," but note that this applies only to basic order. Acquisition of word order in the broader sense would require the children to make use of the variability available in the target language, which they reportedly did not.

Later studies on early ASL word order contradict the Hoffmeister findings. Schick and Gale (1996) analyzed the early word order patterns of 14 deaf children of deaf parents and found no evidence of strict SVO order. Instead, they reported that word order was so variable, it seemed almost random. Chen (1998) calculated frequency for the word order types reported in Hoffmeister (1978) (based on numerical data) and found that OV and VS orders were produced quite often, especially at the youngest ages. From these studies, it seems clear that young signers do not exhibit a basic word order stage after all. Instead, early word order is highly variable. If this variation is random, we must conclude that word order is acquired late in ASL. Under such a scenario, there would be no evidence of adult-like variation in the data, nor of a basic word

order stage, suggesting that the word order parameters had not yet been set. On the other hand, variation reflecting the variation in the input would indicate early acquisition of word order, even without evidence of a basic word order stage.

Our first task, then, is to compare the word order variation found in child and adult ASL. In this study I will consider only one noncanonical word order OV.² This order occurs often in adult ASL, is licensed in more than one context and has been reported in previous studies of child ASL, making it a natural candidate for early adult-like variation.

3. OV word order in adult ASL

I will consider three types of morphologically licensed OV, marked by spatial, aspectual, or handling morphology on the verb. ASL is a pro-drop language, allowing null subjects (as well as null objects). Overt subjects normally appear before the object and verb, unless the object is topicalized. I will discuss topicalization in more detail in section 6.

Spatial verbs are signed to a specific point in space, specifying that the action was performed at that location or to an object in that location. An example of a spatial OV is given in (1). Aspectual morphology, characterized by repetition of the sign along an elliptical path, is illustrated in (2). Finally, handling morphology is realized as a handling classifier on the verb, or a handshape appropriate for grasping some imaginary object. Thematically, this object may either be an instrument, as in example (3), or a theme (Chen 2000, Meier 2000).

- (1) BALL THROW-INTO-CORNER
'I threw the ball into the corner.'
- (2) SALLY PAPER TYPE-asp
'Sally typed and typed her paper.'
- (3) BABY FEED-WITH-SPOON
'(I) fed the baby with a spoon/ spoon-fed the baby'

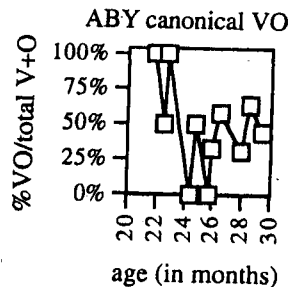
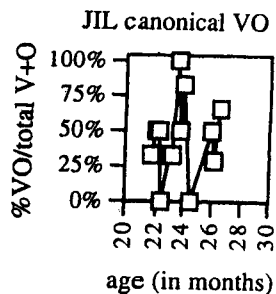
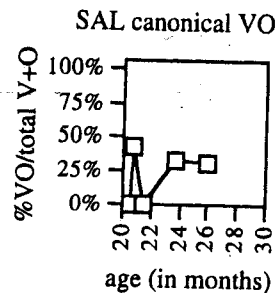
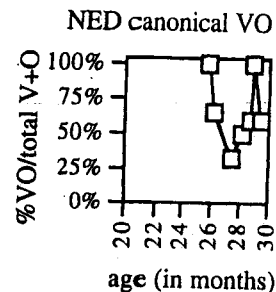
Again, I assume that all three OV constructions discussed here are derived from the SVO underlying word order via movement. I assume similar structure for spatial, aspectual and handling forms of OV. In each case, the verb raises to a head-final functional projection to check the relevant morphology, leaving behind a copy in its original position. This copy may be phonetically realized

resulting in constructions with (S)VOV order, or delete at PF, yielding (S)OV order. For detailed analysis of the syntax of adult (S)OV and (S)VOV constructions, see Fischer and Janis (1992), Matsuoka (1997) and Chen (2000).

4. Early use of canonical VO order

I investigated sign combinations of NED, SAL, JIL and ABY, four deaf children from the ASL corpora held at the University of Connecticut. All four were learning ASL as their first language from deaf parents.³ They were filmed on a weekly or biweekly basis over two years. Videotapes were transcribed by deaf native signers, and searched in conjunction with the resulting transcripts for utterances containing an object and a verb. The analysis presented here spans a period from about 20 to 30 months of age. The graphs in (4) show the percentage of VO utterances produced by each child at each age sampled.⁴

(4) Percentage of canonical VO word order



The graphs show that all four children are quite variable in their choice of word order for verb and object combinations. There is no evidence of any point at which the canonical order VO consistently dominates.

5. Reanalysis considering adult-like variation

An explanation for the variability in (4) is that children are producing OV sequences consistent with the adult grammar. To investigate this possibility, all OV utterances were examined for characteristics of the grammatical OV constructions described in section 3. Utterances were coded as spatial OV if the verb was articulated towards a specific point in space, aspectual OV if the verb was reduplicated, and handling OV if the verb was signed with a handling classifier. Examples of each OV type are given in (5) through (7). All OV sequences identified by these criteria, together with the VO sequences, counted as instances of adult-like word order, yielding the graphs in (8).

(5) YELLOW THROW-INTO-CORNER (SAL, 20.75 months)

'I threw the yellow one (ball) into the corner.'

(6) CAT SEARCH-asp (JIL, 26.0 months)

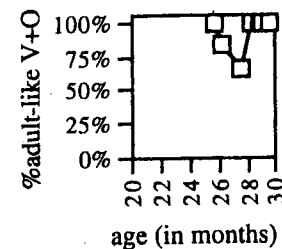
'I'm looking and looking for the cat.'

(7) BAG IX(bag) PICK-UP-BY-HANDLE (SAL, 21.5 months)

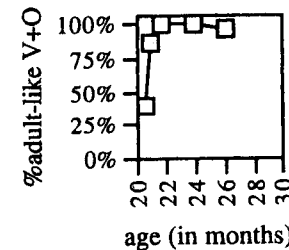
'Pick up that bag.'

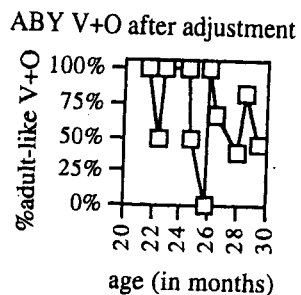
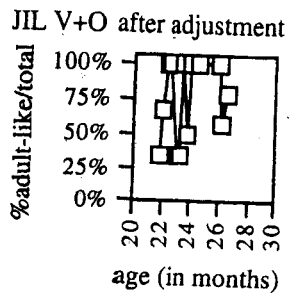
(8) Adult-like use of word order

NED V+O after adjustment



SAL V+O after adjustment





The new graphs for NED and SAL, and up to a certain point for JIL, show that the children's variation in word order is not random. Rather, it reflects variation in the target language. Recall my assumption that word order variants are derived from the basic word order. By extension, if the child produces adult-like word order variation, she must already have acquired the basic word order, as well as the syntactic operations which yield variant surface orders. Production of adult-like variation thus constitutes indirect evidence that the word order parameters have been set, despite the absence of a basic word order stage.

6. Unexplained OV in the ABY corpus: Evidence for early topicalization

The graphs in (8) show that the pattern of word order use for ABY is not consistent with that of the other three children. Whereas the OV production of the other children can be accounted for by spatial, aspectual or handling morphology, this is not the case for ABY. Instead, it seems possible that her frequent use of OV is due to object topicalization.

Topicalization is very common in adult ASL and serves several functions, including contrastive focus and change of discourse topic (Aarons, 1994). Topics are accompanied by the topic nonmanual marker, a particular facial expression required for grammaticality. The scope of this facial expression, represented by the line over *MILK* in (9) spreads over the entire topic, but no further. Although the exact parameters of the topic nonmanual are a matter of debate, most researchers agree that the most salient component is brow raise, and perhaps also a backwards tilt of the head. In addition, the topic sign is held, giving the impression of a pause between the topic and the rest of the sentence.

_____top

(9) MILK, ME BUY FINISH

'The milk, I've already bought (it).'

No OV utterance for NED, SAL or JIL was coded as object topicalization. This was a conservative measure motivated by the striking absence in their corpora of an adult-like topic nonmanual marker, a feature of early ASL also noted by other researchers. Reilly et al. (1991) report late acquisition of the obligatory nonmanuals accompanying WH-questions (first use at 3;6) and topics (first use at 3;0). Certainly, failure to control a structure's grammatical nonmanual does not preclude syntactic knowledge of the structure itself. The presence of a WH-sign, for example, unequivocally identifies a sentence as a WH-question, regardless of the nonmanual. Unfortunately, the only identifying features of object topicalization are word order and the nonmanual. In the absence of the latter, word order alone was judged insufficient evidence that NED, SAL or JIL were producing topic structures.

In contrast, many OV sequences in the ABY corpus are promising candidates for object topicalization. They are characterized by a strong tendency to appear in two sometimes overlapping contexts: with the verb *WANT* and in yes/no-questions. In the 11 transcripts available for ABY between the ages of 21.75 to 29.5 months, she produces 32 OV utterances, 25 of which can not be accounted for by spatial, aspectual or handling morphology. These 25 utterances include 12 declaratives and 13 yes/no-questions. Some examples are illustrated below.

_____br.rai

(10) APPLE WANT

(28.5 months)

'Do you want an apple?'

_____head down

(11) IX(cup) PUT-DOWN-CUP

IX(towards living room)

(24.5 months)

'I'm going to put my cup down over there (in the living room).'

Like topics and WH-questions, yes/no-questions in ASL require a particular nonmanual marker, consisting of a raised brow spreading over an entire CP. Topics are higher than CP, and are therefore outside the scope of the yes/no nonmanual. Yet in (10), the line marked "br.rai" indicates that the brow raise is sustained for the entire sentence, extending over the object in initial position.

This is unlikely to be a simple error in spreading of the yes/no nonmanual, which is known to be acquired early by deaf children (around 1;3, according to Reilly et al. 1990). In addition to the OV yes/no questions studied here, ABY produced numerous yes/no-questions with subjects and verbs, or verbs only, during the period under investigation. These questions were consistently marked with the correct yes/no nonmanual extending over the correct scope, convincing me that ABY has mastered the yes/no nonmanual by this age period. Therefore, I will tentatively analyze the brow raise over initial objects in ABY's OV questions as the adult topic nonmanual.⁵ If this is correct, we must explain why the brow raise is present in OV questions, as in (10), but absent from OV declaratives, as in (11).

7. Prosodic break as a marker for topicalization

In section 6, I gave the standard description of the ASL adult topic nonmanual: raised brows, sometimes accompanied by a head tilt, and a pause between the topic and the rest of the sentence. Although brow raise is considered the most salient component of the topic nonmanual in ASL (a matter under some debate), this is not case for other sign languages. Nespor and Sandler (1999) report for Israeli Sign Language (ISL) that while brow raise is sometimes associated with topicalization, the ISL topic marker is not limited to any one nonmanual feature. They define a number of nonmanual parameters including widened eyes, head nods, and the presence of blinks and holds. By noting the combinations of such parameters at various points in a sentences, they generate highly detailed prosodic descriptions. These show that while the particular combination of nonmanual parameters varies across sentences, all sentences share a striking feature: following the topic, the nonmanual parameters in use up to that point change all at once. In other words, topics in ISL are marked by a general prosodic break separating the topic sign from the rest of the sentence.

ASL topics are essentially characterized by the same kind of prosodic break described for ISL. Fischer (1975) first noted an "intonation break" in ASL, and Liddell later described it as "a sharp change between the facial expression and the head position ... which marks topics and the facial expression and head position which are used during the rest of the sentence" (1980:80). Children learning ASL may initially fail to assign special status to brow raise, assuming that any change in prosody is sufficient to mark topics, as is the case in ISL.

Much of the ABY OV data is consistent with this hypothesis. Of the 25 OV utterances which cannot be accounted for by special verbal morphology, 14 ex-

hibit some kind of prosodic break between the initial object and the remainder of the sentence. Interestingly, the prosodic break never involves a change in brow position, since raised brows occur only in OV yes/no-questions, and remain raised for the duration of the sentence. Instead, ABY's prosodic breaks typically involve repetition or holding of the topic sign, followed by a change in head position. The latter is illustrated in (11), in which the head returns to normal position after the topic. Whereas brow raise is largely limited to OV yes/no-questions, this type of prosodic break occurs in both questions and declaratives.

The OV declaratives with a prosodic break present the clearest evidence for topicalization, since these cases avoid the complicating factor of yes/no brow raise. ABY produces only two such utterances, one of which is already given in (11). Interestingly, in both cases the topicalized object is not a single-sign NP but a VP consisting of an NP and a verb. In fact, clausal objects in the form of an embedded verb are generally quite common in the ABY data, appearing with both word orders. While topicalization in general is widespread in ASL, some have claimed that VP topics are more limited than NP topics, requiring a head nod on the non-topicalized component to be fully grammatical (Aarons 1994, Liddell 1980). I have no explanation for the apparent dominance of VP topics in ABY's OV declaratives. However, the dominance disappears when we broaden our consideration to topics of yes/no-questions, which appear as NPs and VPs with roughly equal frequency.

8. Interaction of WANT and word order

The topicalization account presented in the previous section accounts for about half of the 25 OV sequences in the ABY data which can not be explained by verbal morphology. This still leaves 13 OV utterances for which no explanation is available. The verb WANT occurs in seven of these unexplained utterances, appearing mostly in yes/no-questions, such as (12), but also in some declaratives, as illustrated by (13).

- _____br.rai
- (12) CAT WANT CAT (24.75 months)
'Do you want a cat/to go see the cats?'
- (13) LAY-YOU-DOWN-HERE WANT (28.0 months)
'You want Mom to lay you down here (on the couch).'

A global survey of all 32 OV sequences produced by ABY reveals a statistical preference for WANT yes/no-questions to occur in OV order ($p=0.000035$ by one-tailed Fischer Exact test). One possible explanation is that WANT has some special property in ASL that allows objects to raise to a position higher than the verb, but still within CP. In the case of yes/no-questions, objects undergoing this sort of short raising would still be within the scope of the yes/no nonmanual and thus appear with brow raise. For both yes/no-questions and declaratives, no prosodic break would be required between the raised object and the rest of the sentence, since the object would be too low to be a topic.

I am currently unaware of any literature claiming short object shift with WANT in ASL. However, a small sample of the use of WANT by ABY's mother provides us with a glimpse of this verb's interaction with word order in adult ASL. I selected a one-hour session filmed when ABY was 28 months old and gathered all sequences of WANT and an object produced by the mother for which her head and face could be seen. ABY's mother produced a total of 16 such utterances. In the following table, I compare the data from this sample of the mother's signing with the ABY data.

14) Verb and object combinations with WANT in mother and ABY data

Mother (from one transcript)	ABY (from all 11 transcripts)
10/16 with VO order, 6/16 with OV	12/29 with VO order, 17/29 with OV
Nearly all (15/16) are questions, occurring in both VO and OV orders	13/29 are questions, and occur only with OV word order.
4/6 OV WANT questions have a clear prosodic break, 2/6 do not.	9/13 OV WANT questions have a clear prosodic break, 4/13 do not. Also, 1/4 OV WANT declaratives has a prosodic break; 3/4 do not.
Only 1 declarative, with VO order.	

In this limited survey, ABY's production differs from her mother's in several respects, including overall frequency of OV order with WANT (59% compared to mother's 38%) and word order flexibility in WANT yes/no-questions (ABY limited to OV order, whereas her mother uses both OV and VO orders). Crucially, however, both ABY and her mother produce OV WANT questions that have no prosodic break. While this sample of adult data is clearly too limited to yield incontrovertible results, it nonetheless supports the possibility of WANT

allowing short object shift in adult ASL, a property which may be reflected in some of ABY's otherwise unexplained OV sequences.

9. Conclusions

I have presented evidence that children learning ASL acquire the basic word order of their language early, despite the absence of a basic word order stage. Furthermore, the children in this study begin to acquire adult word order in the broader sense by 28 months, producing noncanonical OV sequences licensed by verbal morphology. I also propose that one of the children produces topicalization structures as early as 24 months, employing a nonmanual marker in the form of a general prosodic break. This marker, while less restrictive than the adult ASL topic nonmanual, is used in other sign languages to mark topics. Finally, I advance the suggestion that WANT allows short object shift, producing OV sequences that are not topicalization and hence do not require a topic nonmanual.

Endnotes

* My thanks to Diane Lillo-Martin for her support in this project, in more ways than one! Many thanks also to our wonderful ASL families and transcribers.

¹ I do not consider the V2 parameter in this study, as ASL is not a V2 language.

² For discussion of early and adult-like ordering of subjects and verbs, see Chen (1998) for ASL, and Coerts (2000) for Sign Language of the Netherlands.

³ The father of one of the children, NED, is hearing, but signs fluently.

⁴ I must note that these percentages are based on very small numbers, with some sessions yielding only one or two utterances with a verb and object.

⁵ In adult ASL, a yes/no-question beginning with a topic is produced with a single seamless brow raise over the entire sentence. Similarly, in ABY's yes/no questions there is no break in the brow raise.

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