The Position of Early WH-Elements
in American Sign Language and Brazilian Sign Language

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WH-Questions in American Sign Language (ASL) and Brazilian Sign Language (LSB) can be formed with the WH-element in a variety of surface positions. This situation has led to different accounts, falling into two main groups: one posits optionally overt WH-movement to a sentence-final [Spec, CP] position; the other posits optional overt WH-movement to a sentence-initial [Spec, CP] position. In this study, we examine the acquisition of WH-questions in ASL and LSB to shed light on this debate with a new data set. Our results support the hypothesis that [Spec, CP] is on the left in these languages.

1. Introduction

The goals of this study are to examine the existing debate about WH structures used in American Sign Language (ASL) and Brazilian Sign Language (LSB). WH-Questions in ASL and LSB can be formed with the WH-element in situ, in sentence-initial or sentence-final position, or doubled, in both sentence-initial and -final positions. The various analyses which have been proposed include hypotheses about the position of [Spec, CP] (in the sentence-initial vs. sentence-final position), and proposals that WH-elements can participate in topic, focus, and tag constructions. We will first present a brief review of the debate in the literature. After that, we will examine language acquisition data from both languages with two Deaf children acquiring each. Finally, we will propose a solution to the competing analysis of these constructions.

2. Background

It is an apparent universal of spoken languages that the specifier of CP [Spec, CP] appears on the left edge of a sentence, even in languages which primarily employ right-sided specifiers (e.g., Palauan; Georgopolus 1991). No real explanation for this universal phenomenon has been offered, but its significance should not be underestimated.

On the other hand, it is also apparently a common phenomenon of sign languages that [Spec, CP] appears on the right edge of a sentence, even if other specifiers are on the left (Neidle et al. 2000 for American Sign Language – ASL; Pfau and Quer 2003 for German and Catalan Sign Languages – DGS and LSC, respectively; Cecchetto and Zucchi 2004 for Italian Sign Language – LIS).

Why would such a difference between sign and spoken languages exist? There is no obvious modality-based explanation for this. Cecchetto and Zucchi (2004) claim that prosodic non-manual markings in sign languages are less costly than intonation in oral languages because of the multi-dimensionality of the former. This gives sign languages an option not available in oral languages, namely, marking of WH-questions through prosody along with rightward WH-movement.

We see no reason to consider the non-manual marking of sign languages less costly than the prosody of spoken languages, as they behave very similarly (Sandler 1999, Nespor and Sandler 1999; Sandler and Lillo-Martin in press). In any case, there is no independent evidence for such a cost difference. While the differences between LIS and ASL or LSB in the distribution of manual signs in WH-questions remain to be explained, we present here evidence for an alternative analysis on which sign languages and spoken languages share the leftward position of [Spec, CP], despite the surface appearances to the contrary.

3. WH-Questions in ASL and LSB

The reason for the controversy over the position of [Spec, CP] in sign languages is that in signed WH-questions the WH-element frequently appears in the sentence-final position, as illustrated in (1).

(1) a. ‾‾‾‾‾‾wh‾‾‾‾‾
   JOHN SEE WHO   (ASL/LSB)
   'Who did John see?'

  b. ‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   BUY COFFEE WHERE
   'Where did (you) buy coffee?'

  c. ‾‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   JOHN SEE WHO YESTERDAY
   'Who did John see yesterday?'

  d. ‾‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   JOHN SEE YESTERDAY WHO
   'Who did John see yesterday?'

  e. ‾‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   BUY CAR (YESTERDAY) WHO
   'Who bought a car (yesterday)?'

Clearly, one possible analysis of such facts would employ a rightward [Spec, CP] and overt WH-movement. Such an analysis has been proposed by Neidle et al. (1997, 2000) for ASL, adopted and adapted for other sign languages by Cecchetto and Zucchi (2004) and others.

Some additional data should be taken into consideration. In both ASL and LSB, WH-elements also appear in the sentence-initial position and doubled, in both sentence-initial and sentence final positions, as shown in (2)-(3).

(2) a. ‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHO BUY CAR   (ASL/LSB)
   'Who bought a car?'

  b. ‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHO YOU LIKE
   'Who do you like?'

  c. ‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHAT JOHN BUY
   'What did John buy?'

  d. ‾‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHERE YOU BUY COFFEE
   'Where did you buy coffee?'

(3) a. ‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHO JOHN SEE WHO
   'WHO did John see?'

  b. ‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHO SEE JOHN WHO
   'WHO saw John?'

  c. ‾‾‾‾‾‾‾‾‾‾‾‾‾wh‾‾‾‾‾
   WHAT JOHN BUY WHAT
   'WHAT did John buy?'

On the rightward movement analysis, examples like (2)b-d are generally unacceptable. When they are found, they involve topicalization of the WH-phrase. Examples like those in (3) display simple repetition. As Neidle et al. observe:

> "In ASL, as in many other languages, sentence-final tags (consisting of a repeated but reduced version of basic material from the main clause) occur productively"

An alternative analysis has been proposed. Noting that examples with doubled WH-elements involve emphasis, Petronio and Lillo-Martin (1997), Wilbur (1997), Quadros (1999), and Nunes and Quadros (2004) propose that WH-movement in ASL and LSB is leftward, with WH-elements appearing in the sentence-final position due to focus.[1] They note that the sentence-final position is used for emphatic focus of non-WH elements as well, as illustrated in (4)-(5).

(4) *ASL* (from Petronio and Lillo-Martin 1997)

  a. ‾‾‾‾‾‾‾‾‾‾‾‾‾hn‾‾‾‾‾
   ANN (LIKE) ICE-CREAM LIKE
   'Ann LIKES ice-cream.'

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[1] Simple repetition and tags are not excluded on the leftward movement account. It is claimed that focused elements can be distinguished from repetition or tags by their prosody – repeated elements having a preceding prosodic break.

                    neg
b. ANN (CAN'T) READ CAN'T
    'Ann CAN'T read.'

                    q
c. ANN (WILL) LEAVE WILL
    'Will Ann go?'

                   whq
d. (WHO) BUY CAR WHO
    'Who bought the car?'

LSB (from Quadros 1999)

                 hn
(5) a. I (CAN) GO PARTY CAN
       'I CAN go to the party.'

                 hn
    b. I HAVE (TWO) CAR TWO
       'I have TWO cars.'

                 neg
    c. I (NO) WILL BUY CAR NO
       'I will NOT buy car.'

                 wh
    d. (WHO) LIKE BANANA WHO
       'WHO likes bananas?'

Lillo-Martin and Quadros (2005) found acquisition evidence supporting the proposed analysis of sentence-final non-WH focused elements. What predictions are made for WH-questions on the focus versus rightward movement analyses?

What children acquiring ASL and LSB have to learn is that these are mixed languages, permitting both WH in situ and WH movement. On the rightward movement account, they have to learn the direction of WH-movement (since on this account, the direction of WH-movement is not universal), and the possibility of WH-elements as topics or tags. On the focus analysis, children must learn that the sentence-final position is used for focus.

On the assumption that children will initially employ sentences with the WH-element in situ or in [Spec, CP] (motivated by the examination of WH-questions in a range of spoken languages), the two proposals make different predictions about the earliest and most common WH-question types expected in language acquisition. These predictions are summarized in (6).

(6)   *Focus Analysis*   *RMA*
      Primary forms: Primary forms:
          WH-in situ   WH-in situ
          WH-initial   WH-final
      Later acquisition: Later acquisition:
          WH-doubling   WH-doubling
          WH-final   Ungrammatical:
                              WH-initial

We tested the predictions in (6) by examining the time-course of acquisition of ASL and LSB, as described in the next section.

4. Acquisition Data

4.1 Participants

We observed two children acquiring ASL and two children acquiring LSB. All of the children were Deaf and exposed to sign language by their Deaf, signing parents. The age ranges for the data reported in the present paper are given in Table 1.

Table 1. Age ranges of children.

Language	Pseudonym	Analysis Begins	Analysis Ends	# Sessions Analyzed	# Child Utterances
ASL	ABY	1;9	2;7	14	3926
	SAL	1;7	2;3	10	2803
LSB	ANA	1;1	3;0	31	560
	LEO	1;9	2;4	21	1028

4.2 Data collection

The children were observed in naturalistic, spontaneous production sessions with their parents and/or a familiar fluent signing researcher. Sessions lasted from 30 to 60 minutes in length, and occurred weekly, semi-weekly, or monthly. They played with toys and books in an ordinary way while being videotaped.

The tapes were transcribed and analyzed in the laboratories. Native signer research assistants produced the transcripts. The analyses were conducted by viewing the tapes as well as examining the transcripts. All WH-questions were collected and categorized. Earliest consistent use was considered age of acquisition.

We categorized WH-question forms into four types. WH-in situ forms included WH-initial subject questions, and WH-final object and adjunct questions. Note that such cases are usually equally open to analysis as string-vacuous moved. We used the in situ analysis for conservativity. WH-initial structures included WH-objects and adjuncts, WH-final structures included WH-subjects. WH-doubles included any doubled WH-element.

4.3 Results

We begin by presenting data illustrating the various WH-question sentence types used by each of the four children.

4.3.1 Aby

Numerous examples of WH-in situ were observed from the earliest transcripts.

(7)   1;9   MOM WHERE
       2;0   IX<cup> WHAT
       2;6   ME SEARCH WHERE

WH-initial questions were also frequently observed from the earliest transcripts.

(8)   1;9   WHERE MOM
       2;2   WHAT IX<book>
       2;2   WHERE SEARCH
       2;4   WHO IX BABY
       2;7   WHAT IX<self> HAVE

WH-double constructions begin at age 2;1.

(9)   2;1   WHERE MOVE-PIECE WHERE
       2;1   WHAT IX<kittens> WHAT

There were no WH-final examples in the sessions analyzed. Note that there were questions which could have used a WH-final (as in (10)), but the WH-initial structure was employed.

(10)   Candidate WH-final:
       2;5   WHAT WET OUT-THERE

4.3.2 Sal

Numerous examples of WH-in situ were observed from the earliest transcripts.

(11)   1;8   BOOK WHERE
       1;8   IX<pictures> WHAT

WH-initial questions were also frequently observed from the earliest transcripts.

(12)   1;7   WHAT IX<giraffe>
       1;8   WHERE BOOK
       2;3   WHO IX<picture>
       2;3   WHERE IX<self> SIT

WH-double constructions begin at age 1;8.

(13)   1;8   WHERE FOOD GREEN WHERE
       1;8   WHERE CHAIR WHERE
       2;2   WHERE IX<book> WHERE

There were no WH-final examples in the sessions analyzed.

4.3.3 Leo and Ana

As with Sal and Aby, numerous examples of WH-in situ were observed from the earliest transcripts.

(14)   1;9   STOVE WHERE   (LEO)
       1;10   IX<fruit> WHAT   (ANA)
       2;4   SIGN IX<camera> WHAT   (ANA)

Similarly, WH-initial questions were also frequently observed from the earliest transcripts.

(15)   1;9   WHERE STOVE   (LEO)
       1;10   WHERE KEY   (LEO)
       1;10   WHERE MY FRIEND   (LEO)
       1;8   WHERE BOTTLE   (ANA)
       1;10   WHAT IX<fruit>   (ANA)
       2;5   WHERE PRESS-BUTTON   (ANA)

No WH-double or WH-final examples were found for Leo or Ana.

The results reported here are summarized in Table 2.

Table 2. Results.

	WH-in situ	WH-initial	WH-double	WH-final
ABY	1;9	1;9	2;1	none
SAL	1;7	1;8	1;8	none
ANA	1;10	1;8	none	none
LEO	1;9	1;10	none	none

4.4 Discussion

We found that children acquiring ASL and LSB use WH-in situ from the first observations. Children acquiring ASL and LSB also use leftward moved WH-initial structures from the first observations. Children acquiring ASL begin to use WH-double structures a few months later (when non-WH doubles come in; see Lillo-Martin and Quadros 2005). Children acquiring LSB do not use WH-doubles at an early age (this finding may be a function of the smaller sample size). Children acquiring ASL and LSB do not use (unambiguous) rightward moved WH-final structures at an early age

We checked the parental input for the same categories of WH-positions (Aby's first 6 files; Sal's first 5 files; all of Ana's and Leo's files). The parents used in situ, (moved) initial, and double structures - but not (moved) WH-final structures. These results support the hypothesis that [Spec, CP] is on the left in ASL and LSB.

We may wonder when WH-final structures are observed in children's utterances. Lillo-Martin (2000) conducted an elicited production study of WH-questions in ASL. This study found that 90% of subject questions were WH-initial for 4-year-old native signers. The remaining 10% were WH-final.

Similarly, for five-year-olds, about 80% of the subject questions were WH-initial, with the rest split between WH-final and doubled. None of the groups (four- to seven-year-olds) had more than about 10% WH-final subjects. Thus, WH-final structures are not at all common in children's signing.

5. Conclusion

We found that the predictions made for WH-questions on the focus analyses are corroborated, that is, children use the WH-in situ form and the form in which the WH-element is moved to the sentence-initial position on the left. Later, they learn that the sentence-final position can be used for focus. Thus, the acquisition results are completely compatible with the Leftward analyses, and surprising for the Rightward approach. In addition, the adults signing to the children formed their questions in the same ways as did the children, following the predictions of the Leftward approach. On the Rightward movement approach, these data would require special hypotheses about the acquisition of WH-movement in ASL, which are unnecessary under the Leftward movement approach.

It is important to note that the non-manual marking of WH-questions is not consistent in the beginning of the acquisition process (found in this study and in Lillo-Martin 2000). Pichler (2001) also suggests that topic constructions appear very early in sign language acquisition even though the non-manual marking associated with topics is not used. This raises even more doubt for the suggestion made by Cecchetto and Zucchi (2004) that non-manual marking is less costly than prosody, and the source of rightward WH-movement. We have supported an alternative analysis, consistent with the apparent universal of spoken languages, that the specifier of CP [Spec, CP] appears on the left edge of a sentence.

Acknowledgments

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