

SIGN LANGUAGE STUDIES

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GRAMMAR, ORDER & POSITION OF WH-SIGNS IN QUEBEC SIGN LANGUAGE

Denis Bouchard
Colette Dubuisson

Abstract

In the quest for language universals, one of the properties that linguists generally take to be universal is that a substantial portion of the lexical items are produced sequentially by speakers; i.e. are ordered in time. There are three aspects to word order: (1) a functional aspect; order conveys information about functional grouping of words and provides some indication of how to interpret sentences; (2) an articulatory aspect; some order is required because more than one sound cannot usually be produced at a time; (3) an order aspect; linguistic theories postulate either that a language has a basic order determined by universal principles, or that there is a single universal order for all languages. On the basis of data from sign languages we argue that this third property is not universal in either of its formulations. There are other means that a language can use to indicate what elements combine functionally and in that case the language has no specific order imposing these combinations. We therefore consider that not all languages have a basic order and that only languages in which word order has an important functional role will exhibit a basic order.

1. Introduction

In the quest for language universals, linguists generally agree that two properties are universal: (a) elements combine to form larger units; this takes place at all levels of analysis (phonological, morphological, syntactic, semantic); (b) a substantial part of these elements is produced sequentially by speakers; i.e. they are ordered in time. Very often, these two properties are related. For example, consider the simple contrast in (1).

- (1) a. John loves Mary.
- b. Mary loves John.

The different orders in these sentences reflect different combinations in syntax and in semantics. In 1a, *loves* and *Mary* are

combined, and the resulting unit is predicated of *John*, whereas it is *loves* and *John* which are more narrowly combined in 1b.

In this paper, we are concerned with order and we question part of its universality on the basis of data from sign languages. There are three aspects to word order. First, there is a functional aspect: order conveys information about the combining of words, which provides some indication of how to interpret the sentence. Second, there is an articulatory aspect to order: some order is required since we cannot, for the most part, produce more than one sound at a time. A third property, which is often found in linguistic generalizations, is that a language has a basic order; either this basic order is determined for each language by universal principles and parameters or there is a single universal order for all language (Kayne 1993).

We will argue that this third property is not universal in either of its formulations. This notion of a basic order depends on the first property, namely the function of order. But the use of word order as a means of accounting for the combination of elements by reflecting structural relations is not universal. There are other means that a language can use to indicate what elements combine to form larger constituents, and in that case, the language has no specific order that reflects these combinations. We therefore consider that not all languages have a basic order—only languages in which word order has an important functional role will exhibit a basic order.

Although the second property, the articulatory constraint, is found in all languages, sequential constraints of articulation vary from one language type to another. In spoken languages, articulatory limitations are such that linearization is very strong because there is only one complex of articulators, namely the vocal tract, that produces a single signal at a time. In sign languages however, sequential constraints are not as strong, because several articulators are available simultaneously: the two hands and arms, the mouth, the eyes, and, in an extended sense, the body.¹ As a consequence, while simultaneous signals in concatenative oral languages are reduced to prosodic variations on the chain of sounds, the five major articulators of a sign language allow various types of simultaneous encodings. We will discuss two examples of si-

multaneous signals in Wh-constructions in the Quebec Sign Language (LSQ), the most widely used sign language in Quebec), which allow the Wh-phrase to be freely ordered in a sentence. First, the scope of a Wh-phrase is encoded simultaneously with manual signs by tilting the head backward and raising or furrowing the eyebrows; second, the elements that the Wh-phrase combines with are indicated by means of different kinds of pointers.

To show that the order of these Wh-phrases is extremely free, we present general properties of sign order in declarative sentences as a basis of comparison. In section 3, we look at various proposals that have been made in the search for a basic order in different sign languages. We indicate what we can learn from the problems that these analyses have encountered, and how they find a solution if order is not considered to be the sole and universal means to indicate semantic combination. We present the distribution of Wh-phrases in LSQ in section 4, with a survey of the analyses based on order that have been proposed to account for these data. We introduce data from LSQ that show that a Wh-phrase may appear in any linear position in a sentence. In order to account for the data, structural analyses based on a deep order require contentless functional categories, with unclear mechanisms triggering movement. This merely restates the problem, needlessly complicates the grammar, and makes the theory virtually unfalsifiable. We survey the different forms that these pointers can take. We discuss two strong tendencies that affect the order of signs in LSQ. First, there is an articulatory tendency to produce signs in an economical order, one which minimizes the movements and eases the flow of signs. Second, there is a figure-ground tendency, whereby a signer first presents the ground and then the figure. In section 5, we introduce an alternative analysis, not based on order. Sign languages, like all other languages, are subject to the general constraint that something must indicate how elements combine together; order is not the only means that provides this information in LSQ Wh-constructions, and therefore a pointer indicating what element the Wh-phrase combines with is obligatorily present in the sentence.

Our intent is not to demonstrate that sign languages are fundamentally, structurally different from speech languages. On the

contrary, we wish to show that the study of sign languages can help us understand speech languages. By looking at the role of order in speech languages from the perspective of sign languages instead of analyzing sign languages as if they shared all the properties of speech languages, we can learn something about the role of order in grammar in general.

2. The function of word order in language

One important goal of some linguistic analysis is to make theory increasingly restrictive. Kayne (1993) explores the possibility that there may be a close match between linear order and phrase structure. He attempts to remove stipulations about phrase structure from the theory. This idea, which is implicitly present in Chomsky (1994), is certainly an interesting one to explore. However, to hold that linear order is a deep property of grammar may be the reflection of an overly speech-centered view of language. Moreover, the additional mechanisms needed to derive the results are far from free, if the system is evaluated as a whole, rather than in terms of a restricted number of isolated aspects of the system.

Theories of grammar have by and large been constructed from the perspective of speech language typology. On the topic of linear order and others as well, we tend to identify as deep properties of grammar, properties that may actually turn out to be artifacts of our own mode of expression. A look at sign languages, which Kayne (1993) hints at in his note 94, and at nonconcatenative languages, should alert us to the fact that the link between order and hierarchical structure may not be so strong. Such languages use means other than word order to indicate which lexemes combine together. As a result these languages do not necessarily have a basic word order.

For instance, morphological markings provide information about the way morphemes interact. A longstanding observation is that the richer morphological information is, the freer the word order is (e.g. Osgood 1963). Thus, in Warlpiri, morphology indicates what each word combines with; consequently, order is very free. In a case language, morphology indicates the grammatical function of noun phrases, which therefore have a relatively free order. In a language with clitics, the grammatical function of a subset of nominals is expressed independently from order, and

order is only used to express the "domain" of the clitic, what it combines with, but not how.

Another means to provide information independent from order is by the parallel encoding of information allowed by prosody, which can express illocutionary force, scope of quantification, of negation, and so on.

In sign languages, simultaneous encoding of information is facilitated by the nature of the articulators involved. For example, a lexeme can be signed on the dominant hand, another one on the nondominant hand, and a third one by a facial expression or by mouthing, all of this simultaneously [e.g. YOUR CAR UNH-UH, respectively]. Because of its four dimensional mode of expression—the 3 of space plus time—a sign language has means other than order and morphological markings to express how elements combine together. Because of this, Fischer (1974) says that it would be preferable to consider separately linguistic universals which are "pure" from those which are modality-specific. The choice between case marking and order would belong to the latter category of universals. Alternatively, one could consider that Osgood's (1963) notion of a compensation system should be enlarged beyond order and morphological markings. However, we believe that order is part of pure linguistic universals but that there is no compensation system in Osgood's sense: the implicit assumption that order is the "deeper" notion that must be compensated is unwarranted. Order is one means among others, such as morphological markings and four-dimensional markings, that provides information about how items combine together.

These cases should encourage us to reconsider our way of looking at order. Linearization may well not be a central property of grammar, but only the effect of using a particular mode of expression. Hence, to attribute ordering properties to fairly low level parameters, as standard head parameter analyses do, may be most appropriate. On the other hand, to derive hierarchical structure from an order based on time slots, as Kayne (1993) proposes, does not seem to be appropriate for languages that have a mode that allows a fair amount of parallel encoding of information in time.

Word order is not a functional necessity, since information about the computation can be expressed in other ways. Therefore, the notion of basic order is relevant only in the grammar of particular languages, not of all languages. In that sense, order has a status similar to the status of features such as tones, which have a much more "significant" role in a tone language than in a language like English. Intonation conveys only syntactic and semantic information in English, but in a tone language it conveys lexical information also.

3. Sign order in sign languages

3.1 Sign order in ASL

We now turn to order in sign languages. First we look at ASL since it is the most widely studied sign language. Then we present data from LSQ. Various orders have been claimed to be the basic order in ASL (see Nadeau (1993) for a good survey). The most frequent one is that ASL is an SVO language. This is proposed in Liddell (1980) and Padden (1988); it is implicit in Lillo-Martin's (1990) analysis of Wh-movement. Fischer assumes that the basic order is SVO because this is the order found in sentences with reversible non-pronominal NPs. The subject and object are reversible "if they could be reversed and one would still have a semantically plausible utterance" (1975:9). So for example, the NPs are reversible in (2) and the order is rigidly SVO, whereas the NPs are not reversible in (3), and there is more freedom in the order (with no non-manual markers of topicalization and the like).²

- (2) a. MAN MUST PAY WOMAN
 b. *MAN MUST WOMAN PAY
 (3) a. MAN MUST PAY B-I-L-L-S
 b. MAN MUST B-I-L-L-S PAY

Aside from SVO, many other basic orders have been defended. For example, Fischer (1990) proposes that ASL is head initial, with the order Head-Compl-Spec. Mixed orders have also been proposed, especially in analyses that exhibit a proliferation of functional categories. For example, Romano (1991) suggests that lexical categories are ordered as Spec-Head-Compl, but functional categories appear as Spec-Compl-Head; this proposal

is also adopted by Petronio (1991). Aarons et al. (1992) adopt the basic order Spec-Head-Compl for all categories, lexical and functional, except for CP which is ordered Compl-Head-Spec.

The reason for the great variety of proposals regarding the basic order of ASL can be attributed to the large degree of variability in the surface order of signs. Petronio's comments are a good example of a typical observation:

One of the most remarked features of ASL is the variety of word orders that is possible.... For example, modals can appear sentence initial, before the verb, or sentence final; adjectives appear after or before the noun. Thus, at surface structure, some phrases are head initial while others are head final. Fischer [1990] argues that although ASL is underlyingly head initial, any definite phrase can be "topicalized" and moved to an unfilled spec that is to the left of its head. Thus, structures that at deep structure were head initial, often appear final at surface structure. (1991:5)

The description of the basic facts given in less theory-oriented terms by Fischer are still representative of the general consensus. Thus, whereas order is limited to SVO in the cases involving reversible NPs, which are fairly restricted in number, it is widely agreed that in general there is a great deal more freedom of word order if subject and object are not reversible. It thus becomes possible to have SOV word order—indeed even OVS becomes possible—when there is only one plausible way to interpret the grammatical relations in the sentence. (Fischer 1975:9)

Thus, the three orders in (4) are possible for non-reversible NPs.

- (4) a. BOY LIKE ICE-CREAM
 'The boy likes ice-cream'
 b. BOY ICE-CREAM LIKE
 c. ICE-CREAM LIKE BOY

Moreover, Fischer observes that, even with reversible NPs, the order can vary. If we take the English sentence (5), there are several ways in which one could translate it into ASL.

- (5) The girl kicked the boy.

If the sentence occurs in isolation, it appears as in (6).

- (6) GIRL KICK BOY

"If, however, the sentence occurs in a more extended discourse, especially if one will wish to refer to the boy and/or the girl again, the most natural way to sign the meaning of [5] is with [7]" (Fischer 1975:19).

- (7) BOY(HERE) GIRL(HERE) SHE-KICK-HIM
(right hand) (left hand) left "kicks" right, from
direction of location of girl to location of boy.

[Calling (7) one sentence and not three may be another instance of applying speech patterns (based on breath and voice) to languages not constrained by the vocal apparatus. Ed.]

The (HERE) in (7) is to represent a very common feature of sign languages in general. A signer can establish the location of a referent by pointing to a locus in the signing space, or making a sign in that location, or some other device such as looking at a locus while making the sign. For the rest of the discourse, that locus is used to refer to that referent. Signers can keep quite a number of referents apart. Once the location of the referents has been established, verbs, which tend to be signed out in space in front of the body, can be signed between these loci, the hands moving or being oriented in relation to the loci, thus indicating clearly and unambiguously the grammatical relations involved. For example, in (7), the verb KICK is a directional verb: it is signed starting from the locus where the referent of GIRL has been established, and is directed towards the locus of BOY, so that the sentence unambiguously means the girl kicked the boy. The order here is OSV. It could also be SOV, as in (8).

- (8) GIRL(HERE) BOY(HERE)SHE-KICK-HIM
(left hand) (right hand) left "kicks" right, from
direction of location of girl to location of boy.

However, though the order in (8) is possible, (7) is preferred by native signers. As Fischer points out, there is a simple reason for this preference. "A sign like KICK moves from the location of the agent to the location of the patient. If the agent is mentioned after the patient (i.e., if we have OSV order), then the least amount of transition time between signs is used. If, on the other hand, the order is SOV, an additional step of moving hands from the location of the patient back to the location of the agent, in order to start the verb sign, is required" (ibid.). This factor of articulatory economy often determines the preference for the order of signs, over and above other factors.

Summarizing so far, order is free when the subject and object are non-reversible (4), certain articulatory factors determining in part what order will emerge. For reversible NPs, SVO is the order when a sentence is out of context (6). In normal speech, where there is a context, other orders are possible: (7), (8). One reason for this is that the signer uses a very common feature of sign languages: to indicate grammatical functions, the signer uses the fact that each referent is established in its own locus in the signing space.

We should stress that the methodological distinction between working on isolated sentences and on more natural discourse could be an important factor in the fact that SVO is often proposed as the unmarked order for ASL. As Friedman (1976) observes, there are important differences between the two types of data. In isolated sentences, the order tends to be modelled on English (the tendency is even stronger when the sentences are signed from a sentence written in English). As Nadeau (1993) notes, these differences, related to the type of corpus, are normal from a sociolinguistic point of view: there is a continuum between ASL and signed English depending on the degree of formality of the speech situation.

This relative freedom of order in ASL is what is expected, given our conception of the role of order in grammar. We must distinguish between the physical, articulatory factors that induce order, that force us to pronounce sounds sequentially and produce signs sequentially, and the computational role of order in grammar. With regards to grammar, order is not a functional ne-

cessity, but rather one means among others of expressing the combination of elements. If a language makes use of other means to express some combinations, then the role of order is reduced. This is exactly the situation in sign languages. While a sign language has linear components—the signs produced by one hand must follow one another; sentences are separated by time—it is much less linear in other aspects. We saw that this is particularly strong in the case of directional verbs: the four dimensions provide a means of expressing grammatical relations by moving or orienting hands in space.

On the other hand, if a sentence contains a plain class verb as in (9) (see Padden, 1988:38f), and if the NPs are reversible, then information about grammatical functions is expressed by order (which appears to be SVO in ASL), because there is no other means that provides this information.

(9) a. 2-INDEX KNOW 1-INDEX

'You know me'

b. *1-INDEX 1-KNOW-2

'I know you'

However, there is no reason to assign SVO as a basic order for all the other free-order cases and to have elements moved around transformationally to account for the variations. The theoretical apparatus needed to perform these operations is costly: all sorts of abstract triggers have to be postulated (in the form of covert contentless functional categories in current analyses). The cost is heightened by the fact that order is redundant in the case of directional verbs, where the appropriate information can be gathered by other means.

One could object that this view of the role of order, in grammar in general and in ASL in particular, results from a misanalysis of examples such as those involving reversible NPs presented in (7) and (8) above. What we actually have in these sentences, one could claim, is an instance of two topics, BOY and GIRL, followed by a verb with pronouns referring to these topics (as is indicated in a way in Fischer's gloss of the verb as SHE-KICK-HIM). Associating the referents with a locus in the signing space is a device to obviate the necessity for repeating names all the time, and

it is similar to pronominalization. But it is quite different from plain pronominalization, which is simply done by not signing anything. Because a sign language makes use of the four dimensions of time, height, width, and depth, a signer can establish the location of a referent in a locus in the discourse or signing space. Each locus can then be used to refer to the referent assigned to it because the four dimensional aspect of sign languages allows a certain persistence of the referent in the context of an exchange between signers. This persistence is possible because the use of four dimensions allows an actual spatial representation of the referents. With a device that assigns places to the referents, no overt repetition is needed in sign languages; rather the referents can be directly accessed. It is as if one took a picture of X and had that picture of X act on a picture of Y. (This is just to illustrate. We are not claiming that sign languages are some sort of pantomime. We are just trying to give a sense of what four dimensional representations are like.)³

If we return to the analysis of (7) and (8), the indices for BOY and GIRL are each established in their own locus. They remain mentally present for signer and addressee, and the verb KICK is signed to establish a relation between these elements. This is not topicalization and pronominalization (there is no non-manual TOP marker), but a direct use of the permanence allowed by the four dimensions. Therefore, the order of constituents is OSV in (7), SOV in (8).

We conclude that ASL is a mixed language, with an "Elsewhere" approach to order (along the lines of Kiparsky (1973)), following a long tradition begun by Sanskrit grammarians). In each case where its use of space allows ASL to express all the relevant information without the use of order in the computational system of grammar, as with directional verbs, then order is free, since it is not functionally necessary. Elsewhere, if a verb cannot provide such information (and if additionally the NPs are reversible and increase the ambiguity), then ASL reverts to order as a means to express information such as the grammatical functions involved; the order in such cases appears to be SVO. Our impression is that this is the status of order in sign languages in general.

Topicalization

The above is the minimum that one can say about order in ASL. To be convincing, an alternative analysis, one that assumes a basic order for all sentences in ASL, has to show that the numerical surface orders are derived from the unmarked order by scrambling processes, and that there is evidence that the unmarked order is modified because there are correlates, such as patterns of pausing, special topicalization markers, and so on. Aarons et al. (1992) make exactly this claim, so it is important to look at their arguments in detail.

The sensitivity of ASL to discourse factors such as old and new information results in an immense variety of surface word orders. Nevertheless, ASL is a highly configurational language. The underlying clausal structure, as proposed in this paper, is recoverable on the basis of a variety of types of evidence. Correlates of the modification of the unmarked order may include patterns of prosody, such as pausing, or non-manual behavior associated with specific constituent boundaries. The spread of non-manual markings over c-command domains provides another crucial source of evidence for the hierarchical organization of ASL. (1992:136; our emphasis).

As we saw above, the basic order that they assume is Spec-Head-Compl, except for CP which is ordered Compl-Head-Spec. A sentence like (10a) would correspond to the basic order, and the order in (10b) is marked and should have correlates such as a pausing after CAR or a topic marker on CAR.⁴

- (10) a. JOHN KICK CAR
b. CAR, JOHN KICK

Pausing and topic marking are possible with this order, and we do not intend to deny that topicalization and similar processes are possible in ASL. Crucially, however, these are not necessary to obtain the order in (10b). We have seen examples from Fischer (1975) of orders that differ from Spec-Head-Comp without any topic marking or pausing in (7) and (8) above. Aarons et al. themselves, who are careful in their description of the data, discuss the sentences in (11) and (12) (their (4a,4b) and (13, 14), respectively), without indicating that any pause or topic marking is

needed in the order where the sentential complement precedes the head verb (11a) and (12a).⁵

- (11) a. wh⁶ pst
MARY SEE_{t_i} YESTERDAY WHAT_i JOHN WONDER
- (11) b. _____ wh
JOHN WONDER MARY SEE_{t_i} YESTERDAY WHAT_i
'John wonders what Mary saw yesterday'
- (12) a. neg wh
JOHN NOT LIKE TOMATO BILL THINK
'Bill thinks John doesn't like tomatoes'
- b. neg
BILL NOT THINK JOHN LIKE TOMATO
'Bill doesn't think John likes tomatoes'

In (11) and (12) the lines above the sentences represent non-manual behaviors. In (11) the non-manual grammatical marking for questions is expressed as a lowering and squeezing together of the eye brows (Baker-Shenk 1983:78, Aarons et al. 1992:105). In (12), the negative headshake, which is usually realized with NOT, can extend over the scope domain of the negation. However, there are no topic markers in these sentences.

Given that special markings are not always necessary when the order differs from Spec-Head-Compl, this is not an argument in favor of such an unmarked order. One could propose that there is a zero topic marking present in the cases that show no overt topic markings. However, this is begging the question. If a zero topic is not called for on independent grounds, the appeal to a zero topic deprives the analysis of any predictive power.

Spreading in c-command domains

Aarons et al. present another intricate argument in favor of their unmarked order. They argue that the restriction on the spreading domains of non-manual markings constitute evidence against an analysis of ASL that holds that Wh-movement to Spec of CP is leftward, as claimed by Lillo-Martin (1990), for example, and also against analyzing ASL as a nonconfigurational language

because of its great variety of surface word orders. They claim that ASL is highly configurational and that the following data on the spreading of non-manual Wh-markings can only be accounted for in terms of rightward Wh-movement to Spec of CP.

Consider the three possibilities where a Wh-phrase can appear: initially, in situ, and in final position. If it appears initially and is not a subject (which could be in situ), as in (13), Aarons et al. say that the sentence is ungrammatical, whatever non-manual markings are assigned to the sentence.⁷

- (13) a. *WHAT JOHN BUY YESTERDAY (non-manuals left unspecified)
 wh
 b. *WHO_i STEPHANIE LOVE t_i
 'Who does Stephanie love?'

If the wh-phrase remains in situ, as in (14), then the non-manual Wh-marking must obligatorily spread over the whole IP.

- (14) a. ______{wh} ______{pst}
 [JOHN BUY WHAT YESTERDAY]IP (+wh)
 b. ______{wh} ______{pst}
 * [JOHN BUY WHAT YESTERDAY]IP (+wh)
 'What did John buy yesterday?'

If the Wh-phrase is in final position as in (15) (as is evidenced by the fact that it follows the sentential adverb, according to Aarons et al.), then the Wh-marking must appear on the Wh-phrase itself and only optionally spreads to the IP.

- (15) ______{wh} ______{pst}
 [JOHN LIP-READ t_i YESTERDAY] IP WHO_i
 'Who did John lip-read yesterday?'

Aarons et al. account for the spreading facts in the following way. They assume, following Liddell (1980), that the spreading domain of a non-manual marker extends over c-command do-

main of the trigger. Sentences like that in (13), with an initial Wh-phrase, are ungrammatical because movement is only to the right in their analysis. When in situ as in (14), the trigger for the non-manual Wh-marking, the complementizer C, is not expressed by lexical material outside of IP; assuming that the non-manual Wh-marking must be borne by something with phonetic content, this explains its obligatory spreading. When the Wh-phrase is final, it is in Spec of C in their analysis; therefore, if we assume that the [+wh] feature of C is shared by Spec of C, the Wh-phrase itself must bear the non-manual Wh-marking and thus satisfies the requirement that this marking be borne by lexical material, so that the spreading over IP is optional.

Alternative analyses

The analysis proposed by Aarons et al. is elegant, but it is not the case that the data on the spreading of Wh-marking "can be accounted for only in terms of rightward wh-movement" as they claim (1992:111). There are alternative analyses that fare at least as well. For example, the cases with a final Wh-phrase might involve two sentences, as Lillo-Martin (1990) suggested for (16) (her example (10); a subscript indicates the locus associated with a referent).

- (16) a. BILL FEEL _μJOHN "LIKE" SOMEONE. cWHO cPRONOUN _{wh}
 'Who does Bill think John has a crush on?'

Moreover, a sentence with a final Wh-phrase like (15) could be interpreted as a topicalization, as if everything but the Wh-phrase was topicalized. Given the sensitivity of ASL and other sign languages to factors such as figure and ground, this view of (15) is quite plausible, as is the double sentence analysis of (16), with the first part establishing the ground for the question. Unless very clear arguments can be made that these are absolutely impossible analyses of (15) and (16), then the spreading facts are not knockdown evidence for rightward Wh-movement.⁸

One could simply claim, for example, that non-manual Wh-marking is always a property of the clause over which the scope of the Wh-phrase extends, and it obligatorily spreads over that whole clause. When the Wh-phrase is internal to a clause (in situ

in the terms of Aarons et al.), then the Wh-marking extends over that clause. When the Wh-phrase is final, there are two possibilities. First, the Wh-phrase is actually in another sentence—in the double sentence analysis—or “left behind” in another clause—in the analysis that has the rest of the clause topicalized, so the spreading is only over the Wh-phrase because it is alone in its clause. Second, the Wh-phrase is final but in situ, assuming free word order: therefore, the spreading is over the whole clause. These two possibilities give the impression that there is optional spreading, but there isn’t: rather, there are two analyses for the same sequence of signs. (This is presumably a better analysis on conceptual grounds, given the increasingly dubious status of optionality in current theory. See Chomsky (1994), for example.)

The analysis could also extend to initial Wh-phrases by adopting the proposal by Aarons et al. that these can only be topicalized phrases. However, given the lack of consensus about the data noted above, we will need a clearer picture of the data before we can ascertain anything about initial Wh-phrases.

The alternative just proposed is compatible with the relatively free order analysis that we argued for. It can also account for another common property of Wh-constructions in sign languages, the possibility of two instances of the same Wh-word appearing in a sentence. A Wh-word can appear simultaneously sentence-initially and in situ as in (17), with the initial Wh-word optionally bearing topic marking.

- (17) (top)/wh ______{wh}

______{psl}
WHAT,JOHN BUY WHAT YESTERDAY
‘What, John bought what yesterday?’

This duplication can also involve an initial and a final Wh-phrase:

- (18) (top)/wh ______{wh}

______{psl}
WHAT,JOHN BUY _i YESTERDAY WHAT_i

However, Aarons et al. claim that the combination of a medial and final Wh-word is not possible, unless there is a strong pause before the final WHAT, in which case they say the WHAT is a tag:

- (19) *JOHN BUY WHAT YESTERDAY WHAT (non-manuals left unspecified) ‘What did John buy yesterday?’

They account for this by saying that a Wh-word cannot appear both in situ and in Spec of C, which is what would take place in (19). In (17) on the other hand, the initial Wh-word is in a topic position and this allows duplication (they do not say this explicitly, but it is implicit in their account). A similar situation is found in (18), except that the object has moved rightward into Spec of C.

Crucial features of their analysis carry over to a free order analysis. For example, if the initial Wh-word is topicalized in (17) and (18), then it receives a Wh-marker in its clause, and the Wh-marker of the “copy” in the other clause spreads over that clause. As for (19), there is no topic but there are two Wh-words inside the same clause, which would be excluded if it were the case that only a topic can be duplicated. However, there are subtle indicators of sentence boundaries which could affect the analyses here. These are difficult to pinpoint and since we haven’t had the opportunity to carry out a precise study of ASL, we will discuss this point with respect to LSQ in section 4.⁹

Given that the evidence that there is an unmarked order and that there are correlates when it is modified is far from overwhelming, we assume that it is more prudent to take the strongest stance with respect to the role of order in Grammar in general and in ASL in particular, namely that order plays a role only when it is necessary for it to do so. We conclude, as we did above, that ASL is a mixed language, with an “Elsewhere” approach to order.

3.2 Sign order in LSQ

There are strong reasons to believe that LSQ is also a mixed language in this sense. We discussed ASL extensively because it is the most thoroughly studied of sign languages, especially compared to LSQ, which has only begun to be described. We wanted to indicate that certain strongly held positions about order in sign

languages are not that clearly supported. With false assurances behind us, we can now take a fully open-minded approach to LSQ. We will show that there are additional factors, not discussed elsewhere to our knowledge, that determine the order of Wh-phrases in LSQ. We believe that these factors that we call “Wh-pointers” are probably used in all signed languages and provide an important cue about the role of order in grammar, and, consequently, about the choice of theoretical tools to account for grammatical properties.

In LSQ, all word orders are possible for sentences with manually signed subject and object. The examples in (20) are reproduced from spontaneous discourse or narration corpora.

- (20)
- a. HEARING-PEOPLE(i) iINFLUENCEj DEAF-PEOPLE(j) (SVO)
‘Hearing people influence deaf people’
 - b. WOMAN BIG PIZZA SLICE EAT (SOV)
‘The big woman eats a slice of pizza’
 - c. BROTHER BITE INDEX3 (OVS)
‘It (a dog) bit my brother’
 - d. INTERPRETER THEMSELVES BRING (OSV)
‘They brought their own interpreter’
 - e. WANT INDEX1 DOG (VSO)
‘I want a dog’
 - f. $\frac{\text{TALK WHAT INDEX1 (VOS)}}{\text{wh-q}^{10}}$
‘What am I talking about?’

Nevertheless, the occurrence of both arguments, subject and object, is very unusual. Nadeau (1993) says that she found 12 cases in approximately 1300 clauses.

Nadeau and Desouvrey (1994) studied directional or oriented verbs in LSQ. In general, grammatical relations are clearly established in space by the direction or orientation of the verb, allowing that type of verb to stand alone in a sentence most of the time. When the arguments signed are pronouns, they are redundant. The order in which NPs are signed is not necessary to identify the subject and object.

4. The position of Wh-phrases in LSQ

4.1 Wh-phrases in main clauses

Wh-signs can occur in different positions in LSQ. Dubuisson, Miller and Pinsonneault (1994) observe that the interrogative sign can be placed either at the beginning or at the end of a sentence, or both, as illustrated in (21) to (23).

- (21) $\frac{\text{HOW LEARN SIGN}}{\text{wh-q}}$
‘How did you learn signs?’
- (22) $\frac{\text{INDEX3 PREFER WHAT}}{\text{wh-q}}$
‘What does he prefer (x)?’
- (23) $\frac{\text{WHO ATTRACT WHO}}{\text{wh-q}}$
‘Who attracts me?’

In order to determine the beginning of a wh-question, they took into consideration the backward tilt of the head which obligatorily accompanies this type of sentence (Dubuisson et al. 1991). The initial position of the sentence was thus determined as being the position of the first sign following the sentence boundary.¹¹

The end of an overt interrogative can be marked in several ways. The one most easily recognizable is where the signer stops and awaits a reply. In several cases, however, the signer will ask a series of questions, so as to be more explicit. In these instances, the end of each question is determined by the meaning of the sentence, although it will generally be accompanied by turning the head to the left or to the right, and by a blink. In the case of “false” or “rhetorical” questions, the end of the question is determined by the beginning of the answer, also given by the signer.¹² In the case of questions which form part of referential shift role-playing, it is again the beginning of the answer (given by the signer) which determines the end of the question. The sentence-final position is the position of the last sign before the sentence boundary.¹³

In several other interrogatives, the *wh*-sign occurs neither at the beginning nor at the end of the sentence; thus Dubuisson, Miller and Pinsonneault were led to consider a third possibility: that the *wh*-sign occurs in some undefined position or placement. (24) and (25) are examples of this type.

- (24) $\frac{\text{SPEAK WHAT NEXT}}{\text{wh-q}}$
 'What do we talk about next?'
 (25) $\frac{\text{DISTRIBUTE HOW INDEX1}}{\text{wh-q}}$
 'How am I going to distribute that?'

Examples like these raise serious problems for analyses based on a basic order with movement of the *Wh*-phrase to an initial or final Spec of C. Consider for example the analysis of Aarons et al. (1992). Since the non-manual *Wh*-marking extends over the whole clause, the *Wh*-word *HOW* in (25) must be in situ. Indeed, since the *INDEX1* is under the scope of the *Wh*-marking, it cannot be in a position external to IP in their analysis. But then this would lead us to believe that the basic order of LSQ is with V in initial position. However, this basic order will not work in other cases.

Dubuisson, Miller and Pinsonneault give the examples reproduced in (26) and (27), where the different grammatical functions played by the sign *PETER* is not translated by a difference in sign order, but by a change in the movement of the directional verb which is signed from the object to the subject locus.

- (26) $\frac{\text{WHO PETER}_{(a)} \text{HIRE}_{14}}{\text{wh-q}}$
 'Who is Peter hiring?'
 (27) $\frac{\text{WHO PETER}_{(a)} \text{aHIRE}_{\text{b}}}{\text{wh-q}}$
 'Who is hiring Peter?'

In (26), the verb is signed towards the locus where *Peter* is situated, whereas in (27) it is away from where *Peter* is situated. Since the *Wh*-marking has scope over the whole sentence, the

Wh-word must be in situ, according to Aarons et al. But now we are lead to the basic order OSV for (26) and SOV for (27). We have three sentences, and three different basic orders are required.

Similar problems arise in an analysis with the *Wh*-phrase moving to an initial Spec of C. In (25), *HOW* would be in situ, and therefore a basic order with an initial V would have to be postulated. In (26), the *Wh*-word, an object, could have moved to the initial Spec of C; however, the V is not initial anymore, so the basic order has to be OSV, or SVO, or SOV. If the subject *Wh*-word has moved to the initial Spec of C in (27), then the basic order could be SOV, or OSV, or OVS. There is no one basic order that works for all three sentences.

Moreover, some of the sentences in the corpus of Dubuisson, Miller and Pinsonneault with *WHO* in sentence-initial position and some with *WHO* in sentence-final position appear to be of exactly the same type. Examples (28) to (31) illustrate these instances.

- (28) $\frac{\text{HERSELF WHO}}{\text{wh-q}}$
 'Who is this person?'
 (29) $\frac{\text{WHO BEAULIEU}}{\text{wh-q}}$
 'Who is Beaulieu?'
 (30) $\frac{\text{(...) CL-1// WHO HIRE}}{\text{wh-q}}$
 'Who has hired him?'
 (31) $\frac{\text{(...) VOTE// DECIDE WHO}}{\text{wh-q}}$
 'Who has decided?'

The interrogatives in (28) and (29) were signed by a person who was observing a conversation and then interrupted it to ask for a clarification. In both cases, the signers' hands were at rest (on their knees) before and after the sentence. It is otherwise for sentences (30) and (31), both of which were preceded by a stretch of discourse.

In the view of the native Deaf signers that they consulted, sentences (28) and (29) can fully alternate with (32) and (33) respectively (with all non-manual behaviors remaining unchanged), and this without any change of meaning or emphasis.

(32) WHO HERSELF^{wh-q}
'Who is this person?'

(33) BEAULIEU WHO^{wh-q}
'Who is Beaulieu?'

As for sentences (30) and (31), the signers believe that for isolated sentences, it should be possible to find the forms (34) and (35), respectively.

(34) HIRE WHO^{wh-q}
'Who has hired him?'

(35) WHO DECIDE^{wh-q}
'Who has decided?'

However, they felt that taken in the context of the preceding signs in the video, excerpts (30) and (31) were more natural. In (30), when the signer begins to articulate WHO, he has just produced the classifier ONE (CL-1) ('individual') with the dominant hand. Both signs have similar handshapes. The transition from one sign to the other involves a minimum of change at the phonological level. The choice of the order HIRE WHO would have been less economical since the form of HIRE is less similar to that of the person classifier. In the case of (31), the signer begins to articulate DECIDE immediately after the sign VOTE which was the sign at the end of the sentence before (31). Both signs are two-handed; the handshape and orientation of the non-dominant hand are the same for both signs. Here again, the transition from one sign to the other involves a minimum of change of phonological form between signs. If the order WHO DECIDE had been chosen,

the one-handed sign WHO, with contact on the chin, would have required more extensive changes of form in the transition between the two two-handed signs, thus breaking the overall smooth movement contour.

This leads the Deaf signers consulted to propose that, in context, the signer makes a choice on essentially articulatory grounds. This choice concerns the fluidity of movement between adjacent signs: they hypothesize that this is not a constraint but rather a tendency.

Summing up, the order of signs in LSQ in general (20), and of Wh-signs in particular (21)-(23), is quite free, with a tendency to favor orders where there is fluidity of movement. This freedom of order apparently raises a problem for structural analyses of the distribution of signs based on a single deep order. However, given the assumptions found in much current work, one could remedy this problem by postulating a single basic order and derive the others by movement. For example, if SVO is the basic order, cases where OVS appears to be the basic order, as in (20c), can be derived as follows. A first possibility is to assume that the V has been raised to the head position of a covert functional category above IP (external to the clause), and the O raised to the specifier position of this functional category. Another possibility is to assume an SVO order internal to VP, with the subject in the specifier position; OVS would be derived by raising the V to the head of AGRO above VP, and O to the specifier of AGRO; the subject would remain inside the VP, optionally not raising to the specifier of AGRS above AGRO.

One could also postulate several additional covert contentless functional categories external to the clause, with various possibilities for obtaining the desired order. Without a clear indication of what mechanisms are independently responsible for the presence of covert contentless categories, and an indication of which of their properties trigger movement, functional categories used in this way are just diacritics that indicate that a given order is assumed to be "special". This merely restates the problem. It complicates the grammar because no indication is given concerning what may constitute a potential covert category, nor under what circumstances it may appear in a clause. Loosely introducing

functional categories as need arises in the analysis is not very enlightening and renders the theory virtually unfalsifiable.

4.2 Wh-phrases in embedded clauses; discovery procedures
 Wh-questions that involve embedded clauses are extremely rare in LSQ. One reason for this state of affairs is that sign languages in general, and LSQ in particular, have a strong tendency to use referential shift, thus avoiding the complexities of embedding.¹⁵ Role shifting is similar to direct discourse—a first person pronoun being used to refer to a third person. The speaker shifts the frame of reference. With role shifting, the construction does not involve an embedded clause in the usual sense.

In the cases that do involve an embedded clause, the Wh-phrase generally appears close to the V of which it is an argument or modifier (and is ordered with respect to the V according to articulatory ease). This may give the impression that an embedded Wh-phrase appears *in situ* and cannot be “moved leftward”, as claimed for ASL by Lillo-Martin (1990), or that the Wh-phrase has “moved rightward”, as Aarons et al. (1992) claim. We will argue that this positioning of the Wh-phrase in LSQ is actually due to two strong tendencies, both of which are probably common to all sign languages. There is a tendency to first present the ground, and then the figure, so that the figure Wh-phrase comes after the ground has been given. The other is the tendency related to ease of articulation discussed above; e.g. if the Wh-phrase appears initially and the V it is related to appears near the end of the sentence, in many cases, this will involve an uncanonical back-and-forth arm movement. As we will see however, there are verbs which are signed in a way that do not induce such a violation. In those cases, the ground-figure tendency can be overcome and a sentence with a Wh-phrase “out of position” is acceptable.

We did not find examples of direct Wh-questions involving an embedded clause in the 35 hours of free conversation of the corpus LSQ.88. We therefore proceeded by elicitation.

We prepared 65 sentences written in glosses, each including an embedded clause and a Wh-sign. We used different Wh-signs, some being arguments, others not: WHO, WHAT, WHERE, WHY, WHEN. If we number as in (36) the different positions in

which we put the Wh-sign, the elicited sentences were evenly distributed as in (37).

- (36) initial position of the main clause = 1
 final position of the embedded clause = 2
 initial position of the embedded clause = 3

- (37) Different positions of the Wh-sign:
 1, 2, 3, 1 and 2, 2 and 3, 1 and 3

We worked with two native Deaf signers. The sentences that were to be signed by each of them were presented on a sheet of paper, written in glosses. The signer had to read a sentence, put down the sheet of paper, and sign the sentence for the other Deaf person without changing the order of the glosses. We strongly insisted on the importance of not changing the order of the glosses.

The Deaf person for whom the sentence was signed indicated if he or she understood it, if it was a natural sentence, or asked questions to the signer on what he or she had meant. The elicitation session was recorded on video with three cameras: one on each signer and one on both.

Each sentence produced by a signer was transcribed, including the non-manual behavior. The transcriptions were verified. The signers were asked what meaning they ascribed to each of the sentences that they had signed. All sentences with an unclear grammaticality status were checked with other Deaf informants.

While analyzing the sentences produced by the signers, we realized that, in most cases, they had used role shifting and had changed the embedded clause into direct discourse. For example, for sentence (38), the signer was asked to sign the sentence with the gloss THINK; however, the sentence was actually signed with the meaning of “to wonder” (the two signs are similar, the index being in contact with the temple, except that the latter case is distinguished from the former by a rotary movement). There is a blink after PETER and a change in the facial expression indicates that the role shifting is beginning (at this moment, the signer becomes Peter). Starting from GO, the head of the signer is tilted towards the back, in a movement which is specific to direct

questions, and this position of the head remains unchanged till the end of the sentence.

(38) PETER WONDER MARY GO WHERE

'Peter wonders about Mary: Where has she left for?'

Sentences with a Wh-sign far from the embedded verb, such as in initial position of the main clause, were judged ungrammatical because the Wh-sign was not inside the shifted part of the sentence, where it should have been.

(39) *WHO¹⁶PETER(a) 1-ASK-2 2-LOOKb

'Peter (shifted to I) asks you: who are you looking at?'

In (39), with role shifting starting on PETER, WHO is part of a direct question asked by PETER and therefore it cannot stand outside of the shifted part of the sentence.

Other sentences produced by the informants had to be eliminated because they were highly unnatural. In those cases, the signers looked at the sheet of paper several times while signing the sentence because they could not remember the required order of the glosses—it did not make sense to them. In some instances, the signer produced a blink between almost every sign, which is an indication of perturbation.

In the end, we were left with seven sentences judged as natural or fairly natural, which possibly involved an embedded clause. In fact, in all cases but one, these are instances of indirect questions, as shown in (40).

(40) a. PETER_(a)ASK_b WHO¹⁷MARY_(c)LOOK_d

'Peter asks (someone) who(m) Mary is looking at'

b. ?WHO¹⁸PETER_(a)ASK_b MARY_(c)dINVITE_c WHO
INDEX3_d

'Peter asks (someone) who(m) Mary is inviting'

The only sentence that could be a direct question with an embedded clause is given in (41).

(41)?WHERE(c) PETER_(a)SAY_b GIRL INDEX3_dGO_c

'Where did Peter say (to someone) that the girl went?'

We checked this sentence with several deaf informants: most of them found it entirely unnatural, others found it relatively unnatural. The sentence is signed with a blink after WHERE and the informants agree that, if this blink is absent, the sentence is not good. The sentence as signed also shows a blink before GO. The signer, who looks to the right (toward c) during WHERE, looks to the left (toward locus d) during PETER SAY GIRL, and then looks again to the right for GO, which is signed as ending on the same locus as WHERE was signed. This distribution of the signs in the signing space allows one to establish a link between the two signs GO and WHERE, despite the fact that they are separated by several signs. However, this way of signing is judged uneconomical, since it requires a back and forth motion in space. The sentence signed as in (42) is judged to be natural by all the informants we have consulted.

(42) PETER_(a)SAY_b GIRL INDEX3_(c)GO_d WHERE_(d)

'Where did Peter say (to someone) that the girl went?'

Two tendencies

Summing up, what we found in our elicitation session is that embedded Wh-phrases are signed near the verb which they are related to as an argument or an adjunct, typically towards the end of the sentence. We hypothesize that this is due to the tendency in LSQ to first present the ground, and then the figure. This property is expected in a four-dimensional language. A striking illustration of this is found in spatial indicators as in the following example.

(43) POT FLOWERS

'The flowers are in the pot'

In a container/content relation, it is much more natural for the signer to first establish a container and then indicate its content. This need to first establish the ground is pervasive in a sign language. In the case of embedded Wh-questions, this results in the ground being presented first, and the question about that ground

presented afterward. This is probably why Lillo-Martin glossed (16) (repeated here as (44)) as two sentences, but translated it as only one: the ground corresponds to the first sentence in the gloss and the figure to the second sentence, but they actually form a single sentence as far as ASL is concerned.

- (44) $\text{a}_{\text{BILL}} \text{FEEL } \text{b}_{\text{JOHN}} \text{"LIKE" SOMEONE. } \text{c}_{\text{WHO}} \text{PRONOUN } \text{wh-q}$
 'Who does Bill think John has a crush on?'

As we pointed out above, another factor that conspires against a Wh-phrase at the beginning of the sentence, separated by other material from the V to which it is related, as in (41), is that this forces the signer to make a back-and-forth movement which is articulatorily uneconomical.

A sentence with a Wh-sign at the end of the embedded clause, separated from the verb of the main clause to which it is related, is possible, but not natural. This type of sentence is illustrated in (45).

- (45) $\text{?PETER}_{\text{(a)}} \text{a}_{\text{SAY}} \text{b}_{\text{GIRL}} \text{INDEX3}_{\text{(c)}} \text{c}_{\text{GO}} \text{d}_{\text{WHEN}} \text{(a)}$
 'When did Peter say (to someone) that the girl went?'

A clear indication that there is an articulatory tendency involved here is in the fact that there are cases where the Wh-phrase may appear initially in a position where it is separated from the embedded verb. This is possible because the sentence can be signed with fluidity and there is no unnecessary back-and-forth transitional movement in the signing.

For instance, in (46a), an INDEX oriented toward locus a is produced by the non-dominant hand at the same time as WHO is articulated by the dominant hand. This index is held during the whole sentence. The verb of the embedded clause, SEE, signed with the dominant hand, is oriented toward locus a. In (46b), an INDEX oriented toward locus a is also produced by the non-dominant hand at the same time WHO is articulated by the dominant hand. This INDEX is also held during the whole sentence. The verb of the embedded clause, LOOK, signed with the dominant hand, is signed on locus d (where MARY was situated) and orient-

ed toward locus a. Both sentences are understandable since there is a clear link between the Wh-phrase and the verb it is related with; these sentences are odd however, because they could be signed without the compensatory mechanism of the non-dominant hand.¹⁹ On the other hand, sentence (46c) is much better because here the non-dominant hand is involved in the signing of the verb MEET in any event. The verb of the embedded clause is signed with both hands in the /1/ handshake, the dominant one moving from locus d, where MARY was just signed, and the non-dominant one moving from locus a, where the INDEX was pointing. Each hand moves toward the other and the movement is perfectly integrated.

- (46) a. $\text{?(dh) WHOPETER}_{\text{(b)}} \text{b}_{\text{SAY}} \text{c}_{\text{MARY}} \text{(d) SEE}_{\text{a}}$
 (ndh) INDEX3a-----
 'Who did Peter say (to somebody) that the girl saw?'
- b. $\text{?(dh) WHOPETER}_{\text{(b)}} \text{b}_{\text{SAY}} \text{c}_{\text{MARY}} \text{(d) d}_{\text{LOOK}} \text{a}$
 (ndh) INDEX3a-----
 'Who did Peter say (to somebody) that Mary look at?'
- c. $\text{(dh) WHOPETER}_{\text{(b)}} \text{b}_{\text{SAY}} \text{c}_{\text{MARY}} \text{(d) d}_{\text{MEET}} \text{a/d}$
 (ndh) INDEX3a----- $\text{a}_{\text{MEET}} \text{a/d}$
 'Who did Peter say (to somebody) that Mary met?'

As (46c) illustrates, a Wh-sign can be separated from the verb to which it is related if it is possible to maintain some fluidity in the articulation. This could give the impression that in those cases, the Wh-phrase can be "extracted" from the embedded clause. But this would be ascribing to order an exclusive role in grammar which we do not believe is warranted, as indicated in section 2 above. In any event, there are elements present in the sentences where the Wh-phrase appears to be displaced that allow a link to be established directly between the Wh-phrase and the appropriate verb. We call these "pointers".

5. Wh-phrases and pointers in a 4-D language

We saw in the discussion of (41) (repeated here as (47)) that if the sentence is acceptable at all, it is only if the distribution of the signs in the signing space allows one to establish a link between

the two signs GO and WHERE, despite the fact that they are separated by several signs. In this instance, this was done by signing WHERE on the right, PETER SAY GIRL on the left, and then GO on the right, in the same locus as WHERE. Because WHERE and GO are signed in the same locus, they are unambiguously related.

- (47) ?WHERE_(d)PETER_(a) SAY_b GIRL INDEX3_c GO_d
 'Where did Peter say (to X) that the girl went?'

There are other means to derive the same effect. At the moment the signers produce the Wh-phrases, they can point to a specific locus, and then sign the verb in or toward that locus, or if the verb is anchored on the body, they can add an index toward that locus, as illustrated in (48).

- (48) a. ?WHAT/INDEX3_a PETER_(b) SAY_c MARY_(a)
 UNDERSTAND INDEX3_a
 'What did Peter say (to X) that Mary understood?'
 b. ?WHAT/INDEX3_a PETER_(b) SAY_c MARY_(d) LOOK_a
 'What did Peter say (to X) that Mary was looking at?'
 c. ?(dh) WHO PETER_(b) SAY_c MARY_(d) LOOK_a
 (ndh)INDEX3_a
 'Who did Peter say (to X) that Mary was looking at?'
 d. ?(dh)WHO PETER_(b) SAY_c MARY_(d) LOVE INDEX3_a
 (ndh)INDEX3_a
 'Who did Peter say (to X) that Mary loved?'

In (48a), the Wh-sign WHAT has a /I/ handshape and incorporates an INDEX3 by a supination of the forearm. The verb of the embedded clause, UNDERSTAND, anchored on the temple, is followed by the same INDEX3 as the one incorporated in WHAT. In (48b), the Wh-sign is the same as in (48a) but the verb of the embedded clause is a directional verb, oriented from d (the locus where MARY was just signed) toward locus a (the locus created with WHAT, at the beginning of the sentence). In (48c), the Wh-sign WHO is anchored on the chin. It is articulated by the dominant hand, and simultaneously an INDEX3 is articulated by the

non-dominant hand. The verb of the embedded clause is oriented toward the locus a created by this index. In (48d), WHO and INDEX3 are signed as in (48c); and the verb of the embedded clause, LOVE, which is anchored on the chest, is followed by INDEX3 pointing toward the same locus as the one associated with WHO.²⁰

The signers can also sign a non-anchored Wh-phrase in a given locus, and then point to that locus while signing the verb. For example, in (48a), WHAT could be signed on locus a, without incorporating the INDEX3 directed toward a. In this case, WHAT would have /5/ handshape instead of the /I/ handshape it has when the index is incorporated.

Alternatively, the signers can sign the Wh-phrase while looking at a specific locus, and then sign the verb in or toward that locus, as in (49).

- (49) ?WHO²¹ PETER_(a) ASK_b MARY_(b) LOOK_c
 'Peter asks who Mary is looking at'²²

These various means of indicating what the Wh-phrase combines with we call 'pointers.' A language that makes use of four dimensions has means like these that go beyond the order of manual signs. Wh-pointers can be seen as an enlarged compensation system, beyond order and morphological markings, to express how elements combine together. However, we believe that the implicit assumption that order is the 'deeper' notion that must be compensated is unwarranted. Order is one means among others, such as morphological markings and four dimensional markings, that provides information about how items combine.²³

Pointers have interesting properties and vary from one Wh-phrase to another, depending on some inherent properties of each Wh-sign, and also depending on articulatory properties of the verbs involved.

When the sign WHEN is next to the V, as in (50), no additional pointer is needed to indicate how they combine: their proximity itself can be seen as a pointer.

(50) PETER_(a) ASK_b MARY_(c) GO_e WHEN_(d)

'When did Peter ask (to someone) that Mary left?'

On the other hand, if WHEN is separated from the verb, then a pointer is obligatory. Thus, (51) is ungrammatical without the pointer (here the pointer is the fact that GO starts from the locus where WHEN was signed).

(51) ?WHEN_(c) PETER_(a) ASK_b MARY_(c) GO_e

'When did Peter ask (to someone) that Mary left?'

A locative verb like GO must be signed as directed towards a locus in the signing space, this locus being filled by the referent of the place towards which the subject of the verb is going. As expected, the locative Wh-sign WHERE must always be signed in the same locus as the end of GO, regardless of their order in the sentence. On the other hand, our signers find it odd to have GO and the temporal Wh-sign WHEN signed in the same locus when they are linearly adjacent as in (52).

(52) *PETER_(a) ASK_b MARY_(c) GO_d WHEN_(d)

'When did Peter ask (to someone) that Mary left?'

The awkwardness seems to come from signing the temporal sign where a locative is expected, given the lexical nature of GO. This contrasts with the situation where when is separated from the verb and must be signed in the same locus, as in (51).²⁴ It confirms the specific role of pointers in the signing space as indicators of long distance dependencies.

If we turn to a verb like EAT, which is anchored on the body and therefore cannot be signed in the same locus as WHERE or when, the sentence is possible with the Wh-sign separated from the verb as long as there is a pointer that indicates that WHERE/WHEN is related with EAT.

(53)

?WHERE_(a) WHEN_(a) PETER_(b) SAY_c MARY_(d) EAT (INDEX3_a)

'Where/when did Peter say that Mary ate?'

What is interesting is that not all the pointer strategies can make the sentence acceptable. Thus, the signer cannot sign WHERE/WHEN in a given locus, and then point to that locus with a regular INDEX3 (handshape /1/horizontal orientation of the finger), or look at it, while signing the verb EAT. A specialized locative pointer must be used for WHERE, with a /5/ handshape, palm downward, and a horizontal circular movement of the hand. A specialized temporal pointer must be used for WHEN, with a /B✓/ handshape, palm leftward (for a right-handed signer), fingers upward, with a back and forth vertical movement of the fore-arm.

On the other hand, if the Wh-phrase is an argument of EAT, such as WHAT, a regular INDEX3 cannot be used. Instead, a specialized pointer is required, the curved index finger pointing downward as if to a plate containing food.

(54)a. ?WHAT_(a) PETER_(b) SAY_c MARY_(d) EAT INDEX3_a

b. ?WHAT/INDEX3_(a) PETER_(b) SAY_c MARY_(d) EAT (INDEX3_a)

'What did Peter say that Mary ate?'

Not every type of Wh-phrase is compatible with all pointer strategies, some pointers being specialized according to lexical properties of the Wh-phrases.

6. Summary & conclusion

We found that order is very free in a sign language like LSQ. In the particular case of Wh-constructions, there is a tendency to put the Wh-sign next to the element with which it combines semantically. This use of proximity is part of a system of Wh-pointers. However, this is only a tendency and the Wh-sign can appear just about anywhere, as long as fluidity of articulation is respected. A Wh-sign may appear separated from its semantic combinator, because the four-dimensional mode of a sign language allows it to have other kinds of Wh-pointers that unambiguously indicate what the Wh-sign combines with. Therefore, there is no problem of interpretation or parsing.

There is also a tendency to put the Wh-phrase in final position because of the ground-figure pattern that is favored in a language

with a four-dimensional mode: one first establishes the proposition, and then asks something about it.

This relative freedom of order is expected if we consider that order does not have the universal function of accounting [in speech languages] for the combination of elements by reflecting structural relations. Since there are other means that a language can use to indicate what elements combine, a language does not have to have a specific order that reflects these combinations. We therefore conclude that not all languages have a basic order: only languages in which word order has a high functional role will exhibit a basic order.

If correct, this result has important implications for recent studies on the role of order in universal grammar, such as Kayne (1993) and Chomsky (1994). If some properties of sign languages (and of nonconcatenative languages as well) are an indication that the relationship between order and structure is not universally very strong, then linearization and time slots should not be given a central role in grammar.

Notes

- 1 If we understand an articulator as a means to produce a meaningful signal, then indeed the body may be used to produce this type of grammatically significant signal as we will see below.
- 2 Glosses for signs are given in capital letters. When more than one word are needed, hyphens will be used to connect the words in the sign gloss. Hyphens are also used to connect the letters of a fingerspelled word, as in example (3).
- 3 That the loci are used to assign some permanence to a referent in the context of an exchange is confirmed by the fact that different loci may be used to pick out a given referent within distinct sub-contexts in the discourse. Van Hoek (1992) discusses the following example (her example (2); material in quotation marks was accompanied by marking for referential shift, in which the signer uses changes in eye gaze and/or body orientation to indicate quotation or representation of someone else's perspective.):

(i) I ASK MY ADVISOR INDEX-THERE — I GO PARTY, MIN-GLING—I ASK,

"YOU DO-DO THINK MY PAPER?" INDEX-PRO SAY GOOD WOW,
I "FINE,
WAVE-DOWN." LATER, GO ADVISOR OFFICE INDEX-THERE. I
GO SEE-SEE.

I, "WHAT YOU THINK MY PAPER?" INDEX-PRO SAY LOUSY. I
[look shocked],

"HEY-YOU, I UNDERSTAND WHY BEFORE INDEX-THERE SAY
GOOD?"

'I asked my advisor—I went to this party and we were mingling—I asked him, "What do you think of my paper?" He said, "it's really good." I was thinking, "Fine, never mind." Later, I went to my advisor's office. I stopped to see him for a minute. I asked, "What do you think of my paper?" He said it was lousy. I looked at him in shock—I was like, "Hey, I don't understand, why'd you say before it was good?"

The interest of the example is that the signer uses two different loci for the same referent (namely the advisor), one for the context of the conversation at the party, the other for the context of the conversation in the advisor's office.

4 In ASL, according to Aarons et al., topic is indicated by a non-manual marker which is maintained during the signing of the topic constituent: eyebrows are raised and the head is tilted backward.

5 Sentences (12a-b) are not intended to be minimal pairs. In (12a), negation has scope only over the embedded clause. In (12b), negation is on the matrix clause; the sentence illustrates that the spreading of the non-manual marker of matrix negation can extend into the embedded clause. Abstracting from these properties of negation, the crucial fact with respect to order is that the complement precedes the head in (12a), without special marking.

6 Aarons et al.: "use a solid line to indicate the lexical item with which the non-manual feature is associated, and a dotted line to indicate the domain over which the marking spreads."

7 Sentences like those in (13) are often put forward as grammatical (for example, (13b) is taken from Lillo-Martin and Fischer (1992)). As Christopher Miller points out to us (personal communication), we may very well be in the presence of dialectal variation

here. We group under ASL language varieties of different communities spread out over a vast territory that have had little contact with each other. The differences found in the grammaticality judgments of the data presented by various authors could be very real and should not necessarily be attributed to misinterpretations of the data. In order to present their argument, we will assume the grammaticality judgments to be as in Aarons et al., but with the above caveat in mind.

8 McIntire (1982) goes as far as to say that notions like given and new information may be more suitable to account for order in ASL than notions like subject and object. For example, the two following sentences are both acceptable.

- (i) CAT FENCE JUMP-OVER
'The cat jumped over the fence.'
(ii) FENCE CAT JUMP-OVER

McIntire says that (i) seems more natural if we are talking about the cat, but (ii) is acceptable in a context where we are talking about the fence (it is not good to keep the cat in, for example). McIntire adds that there isn't necessarily a pause separating the locative object from the rest of the sentence in (ii). Deuchar (1983) comes to similar conclusions about British Sign Language: rather than the notions of subject and object, the topic/comment structure seems to be more relevant in determining word order.

9 Aarons et al. give negation as another example of a scopal domain which extends over those constituents that are c-commanded by the operator. They assume that a pronoun which is right-dislocated as in (i) is adjoined to CP; therefore, the pronoun is not c-commanded by the negation and does not bear the non-manual marking of negation.

- (i) neg _____
JOHN_i NOT LIKE TOMATO_i, IX_i
'John doesn't like tomatoes, him.'

Similarly, in a sentence with a final Wh-phrase as (ii), in which they assume that the Wh-phrase has been moved to Spec of CP, the Wh-phrase is not within the c-command domain of negation.

- (ii) _____ wh
neg _____
NOT LIKE TOMATO WHO
'Who doesn't like tomatoes?'

However, the examples that they give all involve subjects. But as their example (10), given in (iii), indicates, subjects never are in the scopal domain of negation.

- (iii) neg _____
JOHN NOT LIKE TOMATO
'John doesn't like tomatoes.'

Therefore, the fact that a subject, or a copy of a subject, in sentence final position is also excluded from the scopal domain of negation, may be independent from its structural position.

10 In the LSQ examples, the scope of the non-manual behavior is always indicated with a full line.

11 Exceptions to this definition are sentences beginning with a coordinating conjunction, such as BUT, and certain sentences which begin with an index2. In effect, in LSQ an interrogative can be preceded or followed by an index2 which is used as an interjection to draw the addressee's attention to the signer's question or statement but does not have any syntactic function in the sentence.

12 In their corpus, Dubuisson et al. found no difference between rhetorical and true questions, other than the direction of eye gaze. They show that the direction of eye gaze is a turn-taking regulator and is not part of Wh-question non-manual behavior.

13 Except when the question is terminated by the type of index2 that we described earlier.

14 In the examples on LSQ, when a gloss is followed by an index a in parentheses, it indicates that the sign has been executed at the location a. When a gloss is preceded and/or followed by indices a and b, without parentheses, it indicates that the sign is moved from locus a to locus b or is oriented from locus a to locus b. The verb HIRE is a "passive verb" in the sense that it is always signed from the patient to the agent.

15 Role shifting, also referred to as referential shift, allows a speaker to take over the role of a protagonist previously situated in a locus in the signing space (Friedman (1976), Padden (1986), Lillo-Martin and Klima (1990), Poulin (1992), among others). There are several indications that role shifting has taken place. Facial expression can be modified and/or the rhythm and manner of signing associated with the protagonist with which the signer is identified change (Lillo-Martin and Klima (1990), Padden (1990)). The position of the body, the orientation of the shoulders, head or

eyes of the signer are shifted. The body of the signer moves, from an unmarked position, to the referential locus of the protagonist whose role is assumed. The most striking and consistent feature of role shifting is the break of visual contact with the addressee, or a change in the direction of the eye gaze (Poulin (1992). It is by interrupting visual contact that the signer indicates to the addressee that the normal frame of reference is being abandoned. The signer can speak to a fictitious addressee, in which case the gaze is directed at this addressee.

16 WHO is signed with the eye gaze directed toward locus b.

17WHO is signed with the eye gaze directed toward locus d.

18 Again, WHO is signed with the eye gaze directed toward locus d. Note that the verb INVITE is a "passive verb" in the sense that it is always signed from the patient to the agent. Some signers consider the first WHO to be a false start.

19 Sentence (46b) is much better if the INDEX3 of the non-dominant hand changes to CL:1 (individual) at the moment the dominant hand signs LOOK.

20 Both (48c) and (48d) are much better if the INDEX3 articulated by the non-dominant hand is held during the whole sentence.

21 WHO is signed with the eye gaze directed toward locus c.

22 This sentence can only be an indirect question because of the lexical requirement of the verb ASK. If ASK is replaced by a verb such as WANT, then a direct question interpretation is fine as in (i);

- (i) WHO PETER_(a) WANT MARY_(b) ↓LOOK_c
'Who does Peter want Mary to look at?'

23 More precisely, order is a surface effect of one such means—hierarchical structure.

24 One must be very careful to properly understand the meaning of indices such as "d", in comparing examples (50) and (52). When two elements such as GO and WHEN bear the same index, this is an indication of the intention of the signer to relate the two items. Two signs could be produced in the same locus without the intention of relating them in such a way, somewhat accidentally, in which case the sentence would not be glossed with a coindexation.

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