

(2002). In (Eds.) Richard Meier, Kearsy Comier & David Quinto-Pozos. *Modality and Structure in signed and Spoken Language*, pp. 241-262.

## 10 Where are all the modality effects?

---

*Diane Lillo-Martin*

### 10.1 Introduction

Sign languages are produced and perceived in the visual modality, while spoken languages are produced and perceived in the auditory modality. Does this difference in modality have any effect on the structures of these two types of languages? Much of the research on the structure of sign languages has mentioned this issue, but it is far from resolved. To some authors, the differences between sign languages and spoken languages are paramount, because the study of "modality effects" is a contribution which sign language research uniquely can make. To others, the similarities between sign languages and spoken languages are most important, for they can tell us how certain properties of linguistic systems transcend modality and are, therefore, truly universal. Of course, both of these goals are worthy, and this book is testimony to the fruits that such endeavors can yield.

In this chapter I address the question of modality effects by first examining the architecture of the language faculty. By laying out my assumptions about how language works in the general sense, predictions about the locus of modality effects can be made. I then take up an issue that is a strong candidate for a modality effect: the use of space for indicating reference in pronouns and verbs. I review some of the issues that have been discussed with respect to this phenomenon, and offer an analysis that is in keeping with the theoretical framework set up at the beginning. I do not offer this analysis as support for the theoretical assumptions but, instead, the framework provides support for the analysis. Interestingly, my conclusions turn out to be rather similar to a proposal made on the basis of some very different assumptions about the nature of the language faculty.

### 10.2 The autonomy of syntax

One of the fundamental assumptions of generative grammar has been the autonomy of syntax (Chomsky 1977). What this means is that the representations and derivations of the syntactic component do not refer to phonological structures

or semantic structures; likewise, phonological or semantic rules do not refer to syntactic structures.<sup>1</sup> As Jackendoff (1997:27) puts it:

[P]honological rules cannot refer directly to syntactic categories or syntactic constituency. Rather, they refer to prosodic constituency, which . . . is only partially determined by syntactic structure . . . Conversely, syntactic rules do not refer to phonological domains or to the phonological content of words.

Clearly, the syntactic component and the phonological component must connect at some point. In recent literature, this point has been called an "interface." Some of the recent research in generative syntax within the Minimalist Program (Chomsky 1995) has sought to determine where in a derivation the syntax-phonology interface lies, and the properties it has. For example, it has long been assumed by some syntacticians (e.g. Chomsky 1981) that there may be "stylistic" order-changing rules that apply in the interface component connecting syntax with phonology. However, aside from the operations of this interface level, known as PF (Phonetic Form), it is generally assumed that the operations of the syntax and of the phonology proper are autonomous of each other. Thus, quoting again from Jackendoff (1997:29):

For example, syntactic rules never depend on whether a word has two versus three syllables (as stress rules do); and phonological rules never depend on whether one phrase is c-commanded by another (as syntactic rules do). That is, many aspects of phonological structure are invisible to syntax and vice versa.

In generative grammar, this hypothesis is captured by models of the architecture of the language faculty in which the output of syntactic operations are fed, through the PF component, to the phonology proper. While the details of the models have changed over the years, the assumption of autonomy has remained.

### 10.2.1 *Autonomy and signed languages*

These proposals about the autonomy of syntax were made after consideration of the properties of only spoken languages.<sup>2</sup> However, it is now well established that signed languages are in every sense "language," and theories of the nature of human language must be broad enough to accommodate the properties of signed languages as well as spoken languages. What would the theory of the autonomy of syntax lead us to expect about the nature of sign languages? Do sign languages force us to reconsider the notion of autonomy?

The null hypothesis is that there are no differences between spoken languages and signed languages. Hence, we might expect that sign languages will display

<sup>1</sup> From here on, I discuss only autonomy of syntax and phonology, since this is the connection that is immediately relevant for questions about potential modality effects.

<sup>2</sup> Jackendoff's recent works, while primarily discussing spoken languages, are an exception in explicitly aiming for a model of language that incorporates sign languages as well.

autonomy just as spoken languages do. What does this mean for the analysis of phonology and syntax in sign languages?

The phonology is the component of the grammar that interacts with the "articulatory-perceptual interface." That is, the output of the phonological component is the input to the articulatory component (for production); or the output of the perceptual component is the input to the phonological component (for comprehension). When these mappings are far from simple, it is clear that the modality of language must be felt in the phonological component. Thus, for example, the features of a sign language representation include notions like "selected fingers" and "circular movement," while those of a spoken language include "tongue tip" and "voice." In other words, the modality of language affects the phonological component.

In view of this inescapable conclusion, it is remarkable to notice how many similar properties sign phonologies and spoken phonologies share. Presumably, these properties come from the general, abstract properties of the language faculty (known as Universal Grammar, or UG). Since I do not work in the details of phonology, I do not offer here any argument as to whether these properties are specific to language or come from more general cognitive principles, although I have made my predilections known elsewhere (see Lillo-Martin 1997; however, for the point of view of some real sign language phonologists, see Sandler 1993; van der Hulst 2000; Kentari, this volume). Let it suffice for here to say that although certain aspects of the modality will show up in the phonology, it has been found that, as a whole, the system of sign language phonology displays in general the same characteristics as spoken language phonology.

Even though the phonological components for signed languages and spoken languages must reveal their modalities to some degree, the theory of the autonomy of syntax allows or a different claim about that level of the grammar. If syntax and phonology are autonomous, there is no need for the syntactic components of signed and spoken languages to differ. The null hypothesis, then, is that they do not differ. In other words, the modality of language does not affect the syntactic component.

This is not to say, of course, that any particular sign language will have the same syntax as any particular spoken language. Instead, I assume that the abstract syntactic principles of UG apply equally to languages in the signed and spoken modalities. Where UG permits variation between languages, sign languages may vary from spoken languages (and from each other). Where UG constrains the form of spoken languages, it will constrain sign languages as well. A clear counterexample to the UG hypothesis for sign language could come from a demonstration that universal principles of grammar – for example, the principle of structure dependence or the constraints on extraction – apply in spoken languages but not in sign languages. To my knowledge, no such claim has been made. On the contrary, several researchers have claimed that

sign languages do adhere to the principles of UG (Fischer 1974; Padden 1983; Lillo-Martin 1991; Neidle *et al.* 2000).

However, there have been claims that sign languages have certain syntactic properties that are a result of the visual-spatial modality. Since the Universal Grammar hypothesis leads to the expectation that signed and spoken languages would all vary within the same set of dimensions, this observation requires further explanation (see Sandler and Lillo-Martin 2001; Meier this volume). One set of apparently modality-dependent characteristics relates to the properties of verb agreement to be discussed here. Such claims should be investigated carefully for their potential to provide evidence against the autonomy hypothesis. First, it must be established that the claims represent true generalizations about some structures unique to sign languages. Next, the level of the phenomenon needs to be investigated. Modality effects at the phonological level may not constitute evidence against the autonomy hypothesis.

Finally, the nature of the phenomenon should be considered. The strongest version of the autonomy hypothesis applied to sign language would say that the syntactic component of every sign language is a potential syntactic component for a spoken language, and vice versa. However, we can break down the contents of a mental grammar into those aspects that come from UG and those that are learned. There must be abundant positive evidence in the environment for those aspects of language that are learned. A weaker version, then, of the autonomy hypothesis applied to sign language would be that there would be no difference between signed and spoken languages with respect to the UG component. Any differences, then, would have to be learnable. While this version of the hypothesis reduces the predicted universal properties of language, it retains the crucial assumption that unlearnable properties (e.g. constraints) are universal.

To summarize, the model presented here is one in which no modality effects would be found in the syntactic component, although the phonological component would contain information about modality. That is, modality effects should be found only at the interface: where the phonological component interacts with the articulatory-perceptual components. Any exceptions must be learnable. Let us now consider whether the available evidence complies with this model.

### 10.3 “Spatial syntax”

One of the greatest challenges for the framework outlined above comes from the use of spatial locations in the grammar of sign languages. The importance of understanding how space functions in sign language is underscored by the number of papers in this volume addressing this topic. Clearly, the use of space is a candidate modality effect that must be examined carefully.

If spatial location were simply one of the components of a sign – as it is in ASL signs like MOTHER or DOG – there would not be such concern over

its analysis. As Liddell (1990) points out, for some signs their location in the signing space simply reflects the articulatory function of space. However, spatial locations are also used to pick out referents and designate the location of elements. In such cases, spatial locations are not simply sublexical, but in addition they convey meaning. Most researchers have assumed (implicitly) that spatial locations are therefore morphemic, and that – just as Supalla (1982) provided a componential morphological analysis of the complex movements found in classifier constructions – some kind of componential morphological analysis of spatial locations could be provided.

DeMateo (1977) was an exception: he argued that spatial locations could not be analyzed morphologically. More recently, this same conclusion has been argued for in a series of publications by Liddell (1990; 1994; 1995; 2000). Before summarizing Liddell’s position, the following sections briefly describe the meaningful use of space in American Sign Language (ASL).

#### 10.3.1 *The use of space in pronouns and verb agreement*

Pronouns in ASL (and as far as we know, every other sign language investigated to date) can be described as indexical pointing to locations that represent referents. In many sign languages, to sign ‘I’ or ‘me,’ the signer points to his or her own chest, although in Japanese Sign Language (*Nihon Syuwa* or NS) the signer points to his or her own nose (Japan Sign Language Research Institute 1997). To sign ‘you,’ the signer points to the addressee. To sign ‘he’ or ‘she,’ the signer points to the intended referent. If the intended referent is not present in the signed discourse, the signer indicates a spatial location that is associated with the referent, and points to this location. Often, the locations toward which points are directed are referred to as “loci,” or R(eferential) loci.

Using space for pronominal reference seems to make the system of pronouns in sign languages rather different from that of spoken languages. Two issues are mentioned here (these issues are also discussed in Lillo-Martin and Klima 1990). First, there seems to be no upper limit to the number of referents that can be pointed to using (distinct) pronoun signs. Indexical pointing toward any spatial locus may constitute a pronoun referring to a referent at that locus. Since between any two geometric points there is another point, it would seem that the number of potential pronoun signs is nonfinite. Second, unlike spoken language pronouns, sign language pronouns are generally unambiguous. Pointing to the location of a referent picks out that referent, not a class of potential referents (such as third person males). These two issues are discussed at more length below.

The process long known as verb agreement in ASL (and other sign languages) makes use of the loci described for pronouns. Verb agreement involves modifying the form of a verb so that its beginning and ending locations correspond

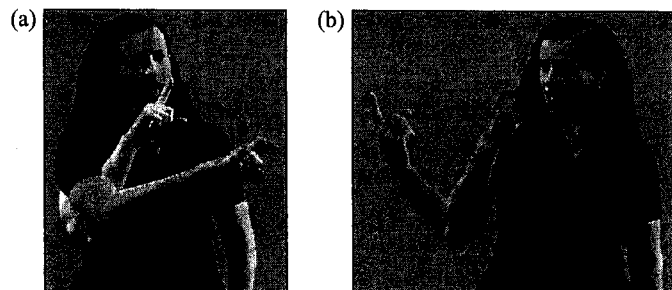


Figure 10.1 ASL verb agreement: 10.1a 'I ask her'; 10.1b 'He asks me'

(usually) to the locations of the referents intended as subject and object, respectively. Often, the verb also rotates so that it "faces" the object as well. This process is illustrated in Figure 10.1.

The process of verb agreement illustrated in Figure 10.1 applies to a class of verbs, but not to all verbs in ASL. Padden (1983) identified three classes of verbs:

- those that take agreement as described above;
- those verbs such as ASL PUT that agree with spatial (i.e. locative) arguments; and
- those that take no agreement at all.

Furthermore, the class of agreeing verbs contains a subclass of "backwards" verbs, which move from the location of the object to the subject, instead of vice versa. The distinctions between the various classes of verbs with respect to agreement have received considerable attention. The importance of these distinctions for the analysis of verb agreement is brought out below.

#### 10.4 Is space really syntax?

##### 10.4.1 The traditional view

According to the traditional description above, loci are linguistic elements with the following characteristics. First, nominals are associated with loci (this process is sometimes called "nominal establishment" or "establishing a referent"). These loci determine the direction of pointing in pronouns. Furthermore, they determine the beginning and ending positions of agreeing verbs.

Some authors have suggested ways to implement this idea by describing verbs (and pronouns) as specified lexically for certain components, such as handshape and skeletal structure, but missing out information about the initial and final location (see, for example, Sandler 1989). This information comes from the

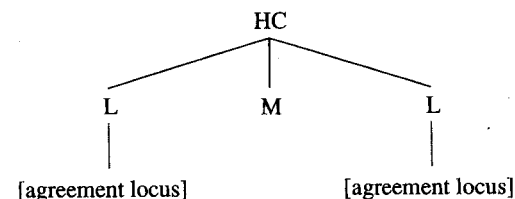


Figure 10.2 Verb agreement template (after Sandler 1989)

morphological process of agreement. When the agreement template combines with the verb root, the verb is fully derived. Sandler's (1989) representation of an agreeing verb is given in Figure 10.2. The problem that arises, however, is how to specify in the grammar the information that is filled in through the process of verb agreement. The locations must be filled in, but how are these locations described in the lexicon? In other words, what does the verb agree with? The general assumption has been that the verb agrees with the subject/object in person (and number). This view is put clearly by Neidle *et al.* (2000:31): "spatial locations constitute an overt instantiation of phi-features (specifically, person features)." However, recall that any number of referents may be established and referred to using verb agreement. If loci represent person features, how many person distinctions must be made in the grammar?

The first traditional account followed the standard analysis of languages like the European ones which mark person, number, and gender on pronouns and verbal morphology. According to that account, first person is marked in ASL by using the location of the signer; second person by the location of the addressee; and multiple third persons can be marked using other spatial locations. (This view was adopted by Padden 1983 and many others.)

Lillo-Martin and Klima (1990) and Meier (1990) noticed problems with this traditional analysis.<sup>3</sup> In particular, Meier argued that no linguistic distinction is made between second and third person. Although there may well be referents in a discourse who play the roles of second (addressee) and third (non-addressee) person, these referents are not picked out using distinct mechanisms in the grammar. The uses of loci for second and third persons are indistinguishable; only the role played by a referent in a particular discourse separates these persons.

On the other hand, Meier argued that ASL does make a linguistic distinction between first and nonfirst person. The location for first person reference is fixed, not changing like that for nonfirst referents. The plural form of the first person pronoun is morphologically idiosyncratic, while the plural forms for

<sup>3</sup> While both of these chapters discussed the problem with respect to pronouns only, the same points – and presumably, analyses along the same lines – would apply to verb agreement. The papers are about the categorical distinctions made by the grammar of ASL, which provide features of nouns with which verbs agree.

the nonfirst persons are completely componential. Importantly, the first person form may be used to pick out a referent other than the signer, in contexts of direct quotation (and what is often called "role shift"), just as first person forms may do in spoken languages. Thus, according to Meier, ASL marks a two-way person contrast: first vs. nonfirst.

This conclusion has been shared by numerous authors working on ASL and other sign languages. For example, Engberg-Pedersen (1993) makes a similar argument for a first/nonfirst distinction in Danish Sign Language, as does Smith (1990) for Taiwanese Sign Language, Meir (1998) for Israeli Sign Language, and Rathmann (2000) for DGS. The main idea seems to be that there is a grammatical distinction between first and nonfirst person, with multiple realizations of nonfirst. Neidle *et al.* (2000:31) state that although "there is a primary distinction between first and non-first persons, non-first person can be further subclassified into many distinct person values."

#### 10.4.2 The problem

Liddell (1990) observed that this traditional view of a locus can be described as "referential equality," by which "Referent<sub>a</sub> = locus<sub>a</sub>." Furthermore, the locus has often been considered a point in signing space. However, as Liddell showed, agreement is not with points in space. Verbs are lexically specified for the height of articulation. The verb GIVE is articulated at about chest height, ASK is articulated at about chin height, and GET-SAME-IDEA-SAME-TIME is articulated at forehead height. Thus, these three verbs would move with respect to three different points even for the same referents. Apparently, a locus must have some depth.<sup>4</sup> In addition, sometimes verbs indicate not only their lexically specified height with respect to the signer, but also the relative heights of the subject or object. In this way, a signer might sign ASK toward a lower point, to indicate asking a child; or toward a higher point, to indicate asking a very tall person.

In a series of publications Liddell (1990; 1994; 1995; 2000) repeatedly raises the questions of how the spatial loci can be morphologically analyzed, and what the phonological specification of the (so-called) verb agreement process is. In order to accommodate his observations about loci, Liddell proposes a new analysis of the use of space in pronouns and agreement. First, he argues that the relation between a referent and a locus is not referential equality, but "location fixing." In this view, associating a referent with a locus amounts to expressing "referent<sub>a</sub> is at locus<sub>a</sub>." The referent might be present in the current

<sup>4</sup> Alternatively, agreement might be described in terms of vectors, as proposed by Padden (1990:125), which are lexically specified for height.

physical situation. If not, location fixing might serve to establish a locus for a "surrogate" (an imaginary referent of full size, used in the cases where verbs indicate relative height of referents), or a "token" (a schematic referent with some depth, but equivalent and parallel to the signer).

Crucially, what Liddell (1995:25–26) recognizes is that in order for pronouns or verbs to make use of the locations of present referents, surrogates, or tokens:

there is no . . . predictability associated with the locations that signs may be directed toward. The location is not dependent on any linguistic features or any linguistic category. Instead it comes directly from the signer's view of the surrounding environment.

Thus, he argues (pp. 24–25), loci are not morphemic:

There appears to be an unlimited number of possible locations for referents in Real Space and, correspondingly, an unlimited number of possible locations toward which the hand may be directed. Attempting a morphemic solution to the problem of directing signs toward any of an unlimited number of possible locations in Real Space would either require an unlimited number of location and direction morphemes or it would require postulating a single morpheme whose form was indeterminate. . . . The concept of a lexically fixed, meaningful element with indeterminate form is inconsistent with our conception of what morphemes are.

Given this state of affairs, Liddell concludes that there is no linguistic process of verb agreement in ASL. Instead, he proposes (p. 26) that:

the handshapes, certain aspects of the orientations of the hand, and types of movement are lexically specified through phonological features, but . . . there are no linguistic features identifying the location the hands are directed toward. Instead, the hands are directed . . . by non-discrete gestural means.

In other words, he employs a mixture of linguistic and gestural elements to analyze "indicating verbs," and specifically argues that the process employed is not agreement.

#### 10.4.3 Why there is verb agreement in ASL

While Liddell's observations are apt, his conclusion is too strong. There are several reasons to maintain an analysis of agreement in ASL. First, the first person and plural agreement forms do have a determinate shape. Just as Meier (1990) used a similar observation about pronouns to argue for a first/nonfirst person distinction in the pronominal system, the first person form of verbs is an identifiable agreement feature. Although the first person form is motivated, it is determinate and listable.<sup>5</sup> Unlike the nonfirst forms, the first person form

<sup>5</sup> Of course, as Liddell points out, even for first-person forms there is not one point for agreeing verbs, since they are lexically specified for different heights.

employs a specifiable location that is also used for nonreferential lexical contrasts. Plural forms (dual, exhaustive, and multiple) have specific morphological shapes that combine predictably with roots. In fact, as Meier points out, the first person plural forms WE, OUR, and OURSELVES involve lexically specified locations "at best only partially motivated" (Meier 1990:180), despite the possibility for "pointing to" the signer and a locus or loci representing the other referents.

Liddell himself does not reject the notion that there is a specific first person form, at least in pronouns (Liddell 1994). However, McBurney (this volume), adopting Liddell's framework, argues that the first/nonfirst distinction is not a grammatical one. For the reasons given here and below, I think the distinction is real.

Furthermore, there are numerous constraints on the agreement process. For one thing, as mentioned earlier, only a subset of verbs mark agreement at all. Meir (1998) characterized verbs that may take agreement as "potential possessors," because on her analysis agreement verbs have a transfer component in their predicate-argument structure. Mathur (2000; Rathmann and Mathur, this volume) characterized verbs that may take agreement as those taking two animate arguments; similarly, Janis (1995) limited agreement to verbs with particular semantic relations, including animate patients, experiencers, and recipients. These characterizations of agreeing verbs are largely overlapping and, importantly, they bring out the fact that many verbs do not show agreement. Furthermore, agreement affects particular syntactic roles: subject and object for transitive verbs; subject and indirect object for di-transitives. Intransitives do not mark agreement; di-transitives do not mark agreement with their direct object. If there is no linguistic process of agreement – but rather a gestural procedure for indicating arguments – why should the procedure be limited by linguistic factors?

To be sure, Liddell (1995) himself points out that the indicating process must interact closely with the grammar. He points out the observation made by Padden (1983) – and before that by Meier (1982) – that while object agreement is obligatory, subject agreement is optional; as well as the fact that certain combinations are ruled out (e.g. FLIRT-WITH-me). He does not, however, offer a way to capture these facts under a system with no linguistic agreement process. Many of the ruled-out forms can be attributed to phonetic constraints, as offered by Mathur and Rathmann (Mathur 2000; Mathur and Rathmann 2001). How would such constraints apply to forms generated outside the grammar?

The arguments given so far have also been made by others, including Aronoff *et al.* (in submission), Meier (2002), and Rathmann and Mathur (this volume). Meier (2002) provides several additional arguments, and discusses at length how the evidence from the development of verb agreement also supports its existence as a linguistic phenomenon. He discusses development both for the young child acquiring a sign language (compare Meier 1982), and in terms of

the emergence of a new sign language, as recently documented in Nicaragua (Senghas *et al.* 1997; Senghas 2000). These observations make a strong case for the existence of a linguistic process of verb agreement.

Another important source of evidence for the linguistic status of verb agreement in sign languages comes from its interaction with various syntactic phenomena. If the treatments suggested here for the following phenomena are on the right track, then some aspects of verb agreement must be considered a linguistic process which applies before the end of the syntactic derivation.

As one example, it has been argued that verb agreement plays a role in the licensing of null arguments in ASL (Lillo-Martin 1986). More recently, Bahan (1996) and Neidle *et al.* (2000) have argued that nonmanual realizations of agreement may license null arguments as well as manual agreement. Whether morphological agreement is limited to manual realization or takes both manual and nonmanual forms, if it plays a role in licensing of null arguments then this is good evidence for the syntactic relevance of agreement.

Further evidence for the syntactic relevance of agreement comes from Brazilian Sign Language (*Lingua de Sinais Brasileira* or LSB). According to Quadros (1999), the phrase structure of sentences with agreeing verbs in LSB is distinct from that of sentences with plain verbs. Evidence for this distinction comes from several sources. The most striking difference between structures with agreeing and plain verbs in LSB is the behavior of negation. While the negative element NO may come between the subject and an agreeing verb in LSB, it may not come between the subject and a non-agreeing verb. Instead, negation with non-agreeing verbs must come sentence-finally (a position also available for sentences with agreeing verbs). Examples are given in (1)–(4).

- |     |  |            |                         |
|-----|--|------------|-------------------------|
|     |  | <u>neg</u> |                         |
| (1) | IX <sub>a</sub> JOHN IX <sub>b</sub> MARY <sub>a</sub> GIVE <sub>b</sub> BOOK NO |            | (LSB; Quadros 1999:152) |
|     | John does not give Mary a book.  |            |                         |
|     |  | <u>neg</u> |                         |
| (2) | JOHN DESIRE CAR NO   |            | (LSB; Quadros 1999:117) |
|     | John does not like the car.  |            |                         |
|     |  | <u>neg</u> |                         |
| (3) | IX <sub>a</sub> JOHN NO <sub>a</sub> GIVE <sub>b</sub> BOOK                      |            | (LSB; Quadros 1999:116) |
|     | John does not give the book (to her).  |            |                         |
|     |  | <u>neg</u> |                         |
| (4) | *JOHN NO DESIRE CAR  |            | (LSB; Quadros 1999:116) |
|     | John does not like the car.  |            |                         |

Another difference between plain and agreeing verbs in LSB is in the ordering of the subject and object. While plain verbs require subject-verb-object (SVO) order (in the absence of operations such as topicalization or focus), agreeing verbs permit preverbal objects. It has sometimes been claimed that the same is

true for ASL (e.g. Fischer 1974), but the status of such non-SVO (subject-verb-object) utterances as a single clause in ASL is disputed (compare Padden 1983).

LSB also differs from ASL in that it has an "auxiliary": a lexical item to mark agreement with non-agreeing verbs. Such an element, although referred to by various names, has been observed in Taiwanese Sign Language (Smith 1990), Sign Language of the Netherlands (Bos 1994), Japanese Sign Language (Fischer 1996), and German Sign Language (Rathmann 2000). Although much more detailed work is needed – in particular to find the similarities and differences between the auxiliary-like elements across sign languages – it seems that in these sign languages the auxiliary element is used when agreement is blocked. Interestingly, there may be structural differences between sentences with and without the auxiliary (Rathmann 2000).

The behavior of the auxiliary in the sign languages that have this element is further evidence for the linguistic status of agreement. However the auxiliary is to be analyzed, like an agreeing verb it moves between the subject and object loci. If it interacts with syntactic phenomena, it must be represented in some way in the derivation, i.e. in the linguistic system.

To summarize, because of the ways that the system known as verb agreement interacts with other aspects of the linguistic system, it must itself be a linguistic system. Further, I have argued, at least some part of agreement must be represented in the syntax, because it interacts with other aspects of the syntax. However, does it matter to the syntax that verb agreement is realized spatially? How would this be captured in a syntax autonomous from phonology? As Liddell has pointed out, if the spatial locations used in agreement could be analyzed morphemically, the fact that agreement uses space would be no more relevant to the syntax than the fact that UGLY and DRY are minimal pairs differing only in location. As he pointed out, however, it seems that the spatial locations cannot be analyzed morphemically. How, then, is this problem to be resolved?

### 10.5 An alternative analysis employing agreement

The analysis that I propose comes from a combination of some of the essentials of the Lillo-Martin and Klima (1990) analysis of pronouns, together with Meier's (1990) crucial distinction, as well as a piece of Liddell's (2000) conclusion. It bears some resemblance to the analysis of verb agreement offered by Aronoff *et al.* (in submission). Their proposal also makes use of ideas from Lillo-Martin and Klima and Meier, but goes beyond those articles by making an explicit proposal for agreement. The present proposal differs from Aronoff *et al.* in accepting part of Liddell's solution to the problem of nonfiniteness of loci. It also adopts some, but not all, of the proposals made by Mathur (2000), and largely overlaps with that of Rathmann and Mathur (this volume). A more detailed comparison of this proposal with these is offered below.

Lillo-Martin and Klima recognize that a nonfinite list of possible pronoun signs cannot be part of the lexicon. As an alternative, they propose separating out the location from the rest of the sign in its lexical specification. That is, they argue that there is only one pronoun sign, specified for handshape and movement, but not for location. This means that person distinctions are not made in the pronominal system, neither in the lexical entries nor in the syntax.

Adopting the more general notion that noun phrases carry a referential index,<sup>6</sup> Lillo-Martin and Klima propose that as for any language, when a pronoun is inserted in the derivation of a sentence, it is assigned a referential index (or R index). In spoken languages referential indices serve to identify relationships between pronouns and potential antecedents. Coindexing is interpreted as coreference; noncoindexing as noncoreference. In the discourse representation, pronouns with identical referential indices are interpreted as picking out the same referent. Signed languages are unique, they claim, only in that the referential index is overtly realized; in contrast, it is unexpressed in spoken languages. That is, signs with identical referential indices must point to the same loci (R loci); signs with different indices must point to distinct loci.

Lillo-Martin and Klima proposed that there is only one pronoun in the ASL lexicon (a conclusion also reached by Ahlgren 1990 for Swedish Sign Language). However, the arguments for a first/nonfirst distinction made by Meier have since been adopted by Lillo-Martin, together with the above analysis for nonfirst forms. How can this analysis be updated to account for verb agreement and Liddell's observations about the use of space?

First, note that the analysis by Lillo-Martin and Klima did not specify how the distinct loci represented by noncoindexing would be realized phonologically. Their point was to show that information about spatial loci was not needed in the syntax. In fact, as Liddell argues, it may be impossible to provide a componential analysis of spatial loci for the use of phonology either. There are, then, two courses that may be taken. The first is to allow modality effects in the phonology – since we know that effects of the modality must be allowed in the phonology – and simply to accept the notion of non-analyzable phonological material. The second course is to follow Liddell in taking the non-analyzable out of language altogether. Following Liddell, then, the locations toward which pronouns are directed would come from the gestural component, which interacts with language – but not from language in the narrow sense.

This explanation may be clearer if we compare the proposal to what we observe about pointing gestures that accompany speech. In spoken English, pointing gestures often accompany pronouns, such as when a speaker indicates three distinct referents while saying, 'I saw him and him, but not him.' Like

<sup>6</sup> In current syntactic theory of the Minimalist Program, indices have been removed from syntactic representations.

pronouns in sign language, these gestures are unlistable (a speaker may point to any location in space), and they disambiguate the reference of the pronouns they accompany. The present proposal is that the nonfirst singular sign language pronoun is lexically and syntactically ambiguous, just as 'him' is in the English example; however, when it combines with a gesture, it may be directed at any location, and its reference is disambiguated.

So far, my proposal is almost just like Liddell's. The difference comes when we move to verb agreement. First, note that although they combine linguistic and gestural components, I have not refrained from calling pointing in sign language "pronouns." As pronouns, they are present in the syntactic structure and participate in syntactic and semantic processes. For example, I expect that sign language pronouns adhere to conditions on pronouns such as the principles of the Binding Theory of Chomsky (1981) or their equivalent. I know of no evidence against this.

I take the same approach to verb agreement. Again following Liddell, I am convinced that a combination of linguistic and gestural explanations is necessary to account for the observed forms of verbs. However, unlike Liddell, I do not take this as reason to reject the notion that verbs agree. In particular, I have given reasons above to support the claim that a class of verbs in ASL agree in person (first vs. nonfirst) and number (singular, dual, and multiple at least) with their subject and object. Hence, my proposal is that there is a process of verb agreement whereby verbs agree with their arguments in person and number, but the realization of agreement must also ensure that coindexing corresponds to the use of the same locus, a process which must involve a gestural component. I believe that Meier (2002) concurs with this conclusion when he states that "although the form of agreement may be gestural, the integration of these gestural elements into verbs is linguistically determined."

The proposal that sign language verbs combine linguistic and gestural components is different from the English example in that for sign language, both the linguistic and gestural components use the same articulators. Okrent (this volume) discusses at length this aspect of Liddell's proposal, and provides helpful information about gesture accompanying spoken languages by which to evaluate the proposal that verbs combine linguistic and gestural elements in sign language.

### 10.5.1 Predictions of this account

The main claim of this account is that while a first person/nonfirst person distinction exists in the syntax of ASL, no further person distinctions are made in the syntax. This is not, of course, to say that all nonfirst forms are equivalent to each other; clearly, coreference requires use of the same location; however, according to this proposal this is not a syntactic requirement, but one of a different level. If a signer intends to pick out the same referent twice, then both instances

must use the same R locus. This is so for all instances of intended coreference within a discourse, unless a new location is established for a referent, either through repeating a location-assigning procedure or through processes that displace referents (Padden 1983). Within a sentence, multiple occasions of picking out the same referent will also be subject to this requirement. One type of such within-sentence coreference is the two uses of the pronoun in sentences like the ASL sentence meaning 'He<sub>j</sub> thinks he<sub>j</sub> will win.' Another type is the coreference between a noun phrase and its "copy" in "subject pronoun copy" (Padden 1983). The various mechanisms for picking out a referent must be directed at the same location. However, what that location is need not be specified in the syntax. Any two instances of coindexing must employ the same location. This does not mean, however, that a categorial distinction is being made between the various possible locations for that referent.

In this context, note the observation made by McBurney (this volume) that no two lexical signs contrast for their locations in "neutral space." Apparently, the spatial contrasts used in agreement are not lexically relevant. The claim here is that they are also not syntactically relevant. If the difference between various nonfirst locations is irrelevant to the syntax, this means that no syntactic principle or process would treat a location on the right, say, differently from a location on the left. On the other hand, the syntax may treat the first person forms differently from the nonfirst forms as a group. Various arguments that the first person form is distinct in this way were offered in the discussion of Meier's (1990) proposal for a two person system. Another argument he offered has to do with the use of the first person form in what is commonly known as "role shifting," to which I would like to add some comments.

Meier observed that the first person pronoun may pick out a referent other than the signer, in contexts of "role shifting." This technique is used for reported speech, but also more broadly to indicate that a scene is being conveyed from the point of view of someone other than the signer. Just as in the English example, 'Bush said, "I won,"' or perhaps, 'Bush is like, "wow, I won!"' the first person pronoun may be used when quoting the words or thoughts or perspective of another.

What is important for the present purposes is that this special characteristic is reserved for the first person pronoun. Other pronouns do not "shift" during role shift (as pointed out by Engberg-Pedersen 1995; also Liddell 1994). In Lillo-Martin and Klima (1990) and Lillo-Martin (1995) we compared the special characteristics of the first person pronoun to logophoric elements in languages such as Ewe and Gokana. These elements have special interpretations in certain contexts, such as reported speech or verbs reflecting point of view. Many other proposals have also been made regarding the analysis of "role shift" (see, for example, Engberg-Pedersen 1995; Poulin and Miller 1995). Whatever the best analysis for the shifting nature of the first person pronoun in ASL, it is clear that



the grammar must be able to refer to the first person form separately from the nonfirst forms. However, it never seems to be necessary to refer to the nonfirst form in location "a" distinct from the nonfirst form in location "b."

Another prediction of this account is that there may be certain special situations in which the first/nonfirst contrast is evident, but the contrast between different nonfirst locations is neutralized. One such special situation may come up in children acquiring ASL. Loew (1984) observed that a three-year-old child acquiring ASL went through a stage in which different nonfirst characters in a single discourse were all assigned the same locus: a so-called "stacking" error. At this point, however, children do not generally make errors with the first person form. This contrast has generally been seen as one showing that children acquire correct use of pronouns and verb agreement for present referents earlier than they do for nonpresent referents. However, it is also compatible with the suggestion that they might first acquire the first/nonfirst contrast, and only later acquire the distinction between different nonfirst locations.

Poizner *et al.* (1987) observed the opposite problem in one of their aphasic signers, Paul D. He made numerous errors with verbal morphology. One example cited is the use of three different spatial loci when the same location was required. However, this error was with spatial verbs (i.e. with verbs that mark locative arguments), not verbs marking agreement with human arguments. It would be interesting to know if Paul D made any similar errors with agreeing verbs. It would also be helpful to re-evaluate data from children, aphasics, and perhaps other special populations, to look for evidence that the first-nonfirst contrast may be treated differently from the contrast between various nonfirst forms in these populations.

## 10.6 Other alternatives

The view of agreement and pronouns suggested here is a blend of ideas from various sources. In this section I mention a few other views and try to clarify what my view shares with the others, and how they are distinct. Aronoff *et al.* (in submission) view agreement in general as a process of copying referential indices. Syntactically, this process is universal; but morphological manifestations of agreement vary greatly from language to language. Their view of agreement in sign languages is that it consists of copying referential indices, such that the referential index of the source argument is copied onto the initial location segment of agreeing verbs, and the index of the goal argument onto the final location segment. They specify source and goal locations rather than subject and object, following Meir's (1998) analysis of agreement as marking source-goal by the path of movement, and subject-object by "facing." Then, in addition to specifying locations, the process of agreement provides information about the verb's facing (toward the object).

I find their view of agreement as copying (or perhaps checking) referential indices felicitous. Aronoff *et al.* present empirical evidence for this view from a fascinating example of a rare type of spoken language agreement that takes a form remarkably parallel to that of sign languages. For example, in Bainouk (a Niger-Congo language), certain forms (such as loan words) are outside of the regular gender agreement system. In such cases, rather than showing no agreement at all in the relevant contexts, an agreeing form may copy the first consonant-vowel (CV) of the noun stem. This kind of system is called "literal alliterative agreement."

McBurney (this volume) provides an extensive array of reference systems across spoken languages, none of which pick out referents in the same way as signed languages. Without having had access to the facts of Bainouk, she suggests that a hypothetical spoken language might copy some phonological feature of a noun's root for further reference. It would seem that Bainouk provides a real example of a language employing such means in its agreement system. Granted, this type of agreement is very rare in spoken languages, but it indicates that the human language faculty has the capacity to develop an agreement system that uses copying of the form of one element onto another.

However, Aronoff *et al.* point out an important difference between literal alliterative agreement and agreement in sign language: "the R-loci that nouns are associated with are not part of their phonological representations and are not lexical properties of the nouns in any way." This detail points to the problem that led Liddell – and me – to posit a gestural component to agreement in sign language. Aronoff *et al.* reject this idea explicitly, citing evidence (such as that discussed above) for the linguistic status of agreement. As I have stated, unlike Liddell I do not reject the linguistic status of agreement.

Another proposal which maintains the linguistic status of agreement while admitting a gestural component is that of Mathur (2000). Mathur is concerned with answering Liddell's challenge to specify phonologically the output of the agreement rule. Mathur's proposal represents an attempt to go beyond specifying the path movement (and facing) of agreeing verbs, in order to fully characterize the changes in location, movement, orientation, and handedness that verbs experience under agreement; this includes the different outputs for different agreeing forms of the same verb. To do so, Mathur suggests envisioning the base form of the verb within a sphere that rotates. The sphere is marked with endpoints that move to align with the loci of the subject and object. The output of agreement is then a result of the base form of the verb, alignment of the sphere, and phonetic constraints on articulation.

Mathur recognizes the problem posed by Liddell regarding the analyzability of loci. In response he follows Liddell in concluding that the linguistic component must connect with the gestural for the specification of loci: specifically, for the specification of the endpoints with which the sphere aligns. Mathur (2000)

adopts the Theory of Distributed Morphology (Halle and Marantz 1993), under which the morphological component is reserved for processes of affixation. In Mathur's model of align-sphere, agreement is not a process of affixation; rather, it is a "re-adjustment" rule. He hence puts agreement at the phonological level.

Mathur discusses extensively the phonological effects of agreement, and he shows evidence that the location of endpoints does have an effect on the output of the agreement process. For example, for a right-handed signer, articulating an agreeing verb such as WARN with a subject location on the right and object location on the left presents no problem. However, if the subject location is on the left and the object location is on the right, the regular output of the alignment process would violate phonetic constraints on ASL (in fact, it would be impossible to articulate, given the physical constraints of the human body). Instead, some other form must be used, such as changing hand dominance for this sign or omitting the subject agreement marker. This shows that the output of the phonological process is affected by the specific locations used in the sign. This conclusion is compatible with Mathur's proposal that the whole process of agreement is phonological, and that the phonological component accesses the gestural.

The idea that agreement as a re-adjustment rule is purely phonological leads to the expectation that it has no syntactic effects, since phonological re-adjustment rules do not apply until after syntax. However, we have seen evidence for syntactic effects of agreement in Section 10.3.3. Independently, Rathmann and Mathur (this volume) have identified additional syntactic effects of agreement. Accordingly, the more recent work develops Mathur's (2000) proposal by putting forth a model of agreement that contains an explicit "gestural space" connecting conceptual structure with the articulatory-perceptual interface, but also including syntactic aspects of agreement within the syntactic structure. In this way, the syntactic effects can be accounted for without losing the detailed account of the articulation of agreeing verbs developed previously.

## 10.7 Conclusions

I have argued that there is a linguistic process of agreement in ASL, but I have agreed with Liddell that in order to account for this process fully some integration of linguistic and gestural components must be made. It is interesting that I come to this conclusion given my working assumptions and theoretical framework, which are quite distinct from his in many ways.

Much further work remains to be done on this issue. In particular, stronger evidence for the interaction of verb agreement with syntax should be sought. Additional evidence regarding the status of the various nonfirst loci is also needed. Another domain for future research concerns the very similar problems

that arise for spatial verbs and classifiers. Although these predicates do not indicate human arguments, they make use of space in a way that poses the same challenge to componential analysis as the agreeing verbs. This challenge should be further investigated under an approach that combines gestural and linguistic components.

Finally, in answering the question that forms the title of this chapter, I have focused on separating phonology from syntax. A deeper understanding of modality effects must explore this putative separation further, and also delve into the phonological component, examining where modality effects are found – and not found – within this part of the grammar.

## Acknowledgments

This research was supported in part by NIH grant number DC-00183. My thoughts on the issues discussed here profited from extensive discussions about verb agreement in sign language with Gaurav Mathur. I would also like to thank the organizers, presenters, and audience of the Texas Linguistics Society meeting on which this volume is based for an energizing and thought-provoking meeting. It was a pleasure to attend a conference which was so well-focused and informative. I have also had productive conversations about these issues with many people, among whom Karen Emmorey and Richard Meier were especially helpful. Richard Meier also provided helpful comments on the written version. Finally, I would like to acknowledge the graduate students in my course on the structure of ASL who – several years ago – encouraged me to consider the idea that the spatial "problems" of ASL could be addressed by an analysis employing gesture.

## 10.8 References

- Ahlgren, Inger. 1990. Deictic pronouns in Swedish and Swedish Sign Language. In *Theoretical issues in sign language research, Vol. 1: Linguistics*, ed. Susan Fischer and Patricia Siple, 167–174. Chicago, IL: University of Chicago Press.
- Aronoff, Mark, Irit Meir, and Wendy Sandler. In submission. Universal and particular aspects of sign language morphology.
- Bahan, Benjamin. 1996. Non-manual realization of agreement in American Sign Language. Doctoral dissertation, Boston University, Boston, MA.
- Bos, Heleen. 1994. An auxiliary in Sign Language of the Netherlands. In *Perspectives on sign language structure: Papers from the 5<sup>th</sup> International Symposium on sign language research*, ed. Inger Ahlgren, Brita Bergman and Mary Brennan, 37–53. Durham: International Sign Linguistics Association, University of Durham.
- Chomsky, Noam. 1977. *Essays on form and interpretation*. New York: North-Holland.
- Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.
- Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

- DeMato, Asa. 1977. Visual imagery and visual analogues in American Sign Language. In *On the other hand: New perspectives on American Sign Language*, ed. Lynn Friedman, 109–136. New York: Academic Press.
- Engberg-Pedersen, Elisabeth. 1993. *Space in Danish Sign Language*. Hamburg: Signum-Verlag.
- Engberg-Pedersen, Elisabeth. 1995. Point of view expressed through shifters. In *Language, gesture, and space*, ed. Karen Emmorey and Judy Reilly, 133–154. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Fischer, Susan D. 1974. Sign language and linguistic universals. Paper presented at Actes du Colloque Franco-Allemand de Grammaire Transformationnelle, Tübingen.
- Fischer, Susan D. 1996. The role of agreement and auxiliaries in sign language. *Lingua* 98:103–120.
- Halle, Morris and Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In *The view from Building 20: Essays in linguistics in honor of Sylvain Bromberger*, ed. Ken Hale and Samuel J. Keyser, 111–176. Cambridge, MA: MIT Press.
- Jackendoff, Ray. 1997. *The architecture of the language faculty*. Cambridge, MA: MIT Press.
- Janis, Wynne. 1995. A crosslinguistic perspective on ASL verb agreement. In *Language, gesture, and space*, ed. Karen Emmorey and Judy Reilly, 195–223. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Japan Sign Language Research Institute (Nihon syuwa kerkyuusho), ed. 1997. *Japanese Sign Language dictionary (Nihongo-syuwa diten)*. Tokyo: Japan Federation of the Deaf.
- Liddell, Scott K. 1990. Four functions of a locus: Reexamining the structure of space in ASL. In *Sign language research: Theoretical issues*, ed. Ceil Lucas, 176–198. Washington, DC: Gallaudet University Press.
- Liddell, Scott K. 1994. Tokens and surrogates. In *Perspectives on sign language structure: Papers from the 5<sup>th</sup> International Symposium on Sign Language Research*, ed. Inger Ahlgren, Brita Bergman and Mary Brennan, 105–119. Durham: International Sign Linguistics Association, University of Durham.
- Liddell, Scott K. 1995. Real, surrogate, and token space: Grammatical consequences in ASL. In *Language, gesture, and space*, ed. Karen Emmorey and Judy Reilly, 19–41. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Liddell, Scott K. 2000. Indicating verbs and pronouns: Pointing away from agreement. In *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*, ed. Karen Emmorey and Harlan Lane, 303–320. Mahwah, NJ: Lawrence Erlbaum Associates.
- Lillo-Martin, Diane. 1986. Two kinds of null arguments in American Sign Language. *Natural Language and Linguistic Theory* 4:415–444.
- Lillo-Martin, Diane. 1991. *Universal grammar and American Sign Language: Setting the null argument parameters*. Dordrecht: Kluwer.
- Lillo-Martin, Diane. 1995. The point of view predicate in American Sign Language. In *Language, gesture, and space*, ed. Karen Emmorey and Judy Reilly, 155–170. Hillsdale, NJ: Lawrence Erlbaum.
- Lillo-Martin, Diane. 1997. The modular effects of sign language acquisition. In *Relations of language and thought: The view from sign language and deaf children*, ed. Marc Marschark, Patricia Siple, Diane Lillo-Martin, Ruth Campbell and Victoria Everhart, 62–109. New York: Oxford University Press.
- Lillo-Martin, Diane, and Edward S. Klima. 1990. Pointing out differences: ASL pronouns in syntactic theory. In *Theoretical issues in sign language research, Vol. 1: Linguistics*, ed. Susan D. Fischer and Patricia Siple, 191–210. Chicago, IL: University of Chicago Press.
- Loew, Ruth. 1984. Roles and reference in American Sign Language: A developmental perspective. Doctoral dissertation, University of Minnesota, MN.
- Mathur, Gaurav. 2000. Verb agreement as alignment in signed languages. Doctoral dissertation, MIT, Cambridge, MA.
- Mathur, Gaurav and Christian Rathmann. 2001. Why not GIVE-US: an articulatory constraint in signed languages. In *Signed languages: Discoveries from international research*, ed. V. Dively, M. Metzger, S. Taub and A. Baer, 1–26. Washington, DC: Gallaudet University Press.
- Meier, Richard P. 1982. Icons, analogues, and morphemes: The acquisition of verb agreement in ASL. Doctoral dissertation, University of California, San Diego, CA.
- Meier, Richard P. 1990. Person deixis in American Sign Language. In *Theoretical issues in sign language research*, ed. Susan D. Fischer and Patricia Siple, 175–190. Chicago, IL: University of Chicago Press.
- Meier, Richard P. 2002. The acquisition of verb agreement: Pointing out arguments for the linguistic status of agreement in signed languages. In *Current developments in the study of signed language acquisition*, ed. Gary Morgan and Bencie Woll. Amsterdam: John Benjamins.
- Meir, Irit. 1998. Thematic structure and verb agreement in Israeli Sign Language. Doctoral dissertation, The Hebrew University of Jerusalem.
- Neidle, Carol, Judy Kegl, Dawn MacLaughlin, Benjamin Bahan, and Robert G. Lee. 2000. *The syntax of American Sign Language: Functional categories and hierarchical structure*. Cambridge, MA: MIT Press.
- Padden, Carol A. 1983. Interaction of morphology and syntax in American Sign Language. Doctoral dissertation, University of California, San Diego, CA.
- Padden, Carol A. 1990. The relation between space and grammar in ASL verb morphology. In *Sign language research: Theoretical issues*, ed. Ceil Lucas, 118–132. Washington, DC: Gallaudet University Press.
- Poizner, Howard, Edward S. Klima, and Ursula Bellugi. 1987. *What the hands reveal about the brain*. Cambridge, MA: MIT Press.
- Poulin, Christine and Christopher Miller. 1995. On narrative discourse and point of view in Quebec Sign Language. In *Language, gesture, and space*, ed. Karen Emmorey and Judy Reilly, 117–131. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Quadros, Ronice Müller de. 1999. Phrase structure of Brazilian Sign Language. Doctoral dissertation, Pontifícia Universidade Católica do Rio Grande do Sul.
- Rathmann, Christian. 2000. The optionality of Agreement Phrase: Evidence from signed languages. Masters report, University of Texas, Austin, TX.
- Sandler, Wendy. 1989. *Phonological representation of the sign: Linearity and nonlinearity in ASL phonology*. Dordrecht: Foris.
- Sandler, Wendy. 1993. Sign language and modularity. *Lingua* 89:315–351.
- Sandler, Wendy, and Diane Lillo-Martin. 2001. Natural sign languages. In *The handbook of linguistics*, ed. Mark Aronoff and Jamie Rees-Miller, 533–562. Malden, MA: Blackwell.

- Senghas, Ann. 2000. The development of early spatial morphology in Nicaraguan Sign Language. In *The Proceedings of the Boston University Conference on Language Development*, ed. S.C. Howell, S.A. Fish and T. Keith-Lucas, 696–707. Boston, MA: Cascadilla Press.
- Senghas, Ann, Marie Coppola, Elissa Newport, and Ted Supalla. 1997. Argument structure in Nicaraguan Sign Language: The emergence of grammatical devices. In *The Proceedings of the Boston University Conference on Language Development*, ed. E. Hughes, M. Hughes and A. Greenhill, 550–561. Boston, MA: Cascadilla Press.
- Smith, Wayne. 1990. Evidence for auxiliaries in Taiwan Sign Language. In *Theoretical issues in sign language research, Volume 1: Linguistics*, ed. Susan D. Fischer and Patricia Siple, 211–228. Chicago, IL: University of Chicago Press.
- Supalla, Ted. 1982. Structure and acquisition of verbs of motion and location in American Sign Language. Doctoral dissertation, University of California, San Diego, CA.
- van der Hulst, Harry. 2000. Modularity and modality in phonology. In *Phonological knowledge: Conceptual and empirical issues*, ed. Noel Burton-Roberts, Philip Carr and Gerard Docherty. Oxford: Oxford University Press.