Part II

Argument Structure and the Compositional Construction of Predicates

6

The Emergence of Argument Structure in Two New Sign Languages

IRIT MEIR

All languages have ways of encoding the particular role that an argument plays in an event, i.e. marking the argument structure of verbs. Three basic mechanisms for encoding argument structure are found in spoken languages: word order, verb agreement, and case markers.[1] Sign languages also have systematic ways of encoding argument structure. Of the three devices, sign languages employ word order and verb agreement.

Though argument structure is fundamental to any human language, grammatical marking of this structure is often redundant, as the relationship between the arguments and the verb may be inferred from the semantics of the verb and the properties of the arguments, together with contextual clues and general knowledge. Yet reliance on semantic and contextual clues may often run into a dead end. While the stretch of words '*boy tree hug*' can have only one plausible interpretation in our world, the stretch '*boy girl hug*' may have two plausible interpretations, which can be systematically distinguished

[1] These grammatical devices, namely word order, verb agreement, and case markers, are usually regarded as marking syntactic roles, not argument structure per se. However, as will become evident in this chapter, in new languages the distinction between the two linguistic levels—argument structure and syntactic structure—has not emerged yet. The two levels are isomorphic. Since I take argument structure to be more basic diachronically than syntactic roles, I refer to the grammatical mechanisms of word order and verb agreement as markers of argument structure. However, they can equally be referred to as syntactic role markers.

only if a communication system develops formal means for marking the hugger and the huggee. Once such a mechanism is introduced into the system, the system becomes context-independent, and can expand its expressive capabilities to describe events that cannot happen in our world, such as '*The tree hugged/talked to the boy*.'

How does such a mechanism emerge and develop, and how long does it take to develop? Does it show up full-blown right from the beginning, or does it take time to develop? Is there one universal course of development? In order to answer these questions, one needs to be able to observe a new language developing. New languages are hard to come by where spoken languages are concerned. Spoken languages and their argument structures are either some thousands of years old, or have developed from older languages which already had argument structure marking devices. Studies of young spoken languages, pidgins, and creoles, indicate that young pidgins rely heavily on word order to express basic syntactic relations (e.g. Hymes 1971) while morphological devices take much longer to develop.

Sign languages as a class are much younger than spoken languages. Most sign languages that have been documented and studied to date are not more than two to three hundred years old. American Sign Language, one of the most widely studied sign languages, is approximately two hundred years old, dating at least from the establishment of the first school for deaf children in 1817, when indigenous sign languages were integrated with a language and pedagogical system brought from France (Lane, Hoffmeister, and Bahan 1996). Some European sign languages are slightly older. However, sign languages can be newer than that. Some sign languages developed recently within the last two or three generations. Such young languages make it possible to observe the oldest as well as the youngest signers of the language. According to Labov's Apparent Time construct (Labov 1994, 2001), the investigation of language use across different aged speakers is a synchronic measure of ongoing language change. Therefore, studying the language of signers of different age groups in these young languages may shed light on the development of linguistic structure almost from the beginning.

My colleagues and I have been fortunate to study two new sign languages that have emerged recently in Israel: Israeli Sign Language (ISL), a sign language that developed as the Deaf community in Israel was formed in the late 1930s, and Al-Sayyid Bedouin Sign Language (ABSL), a sign language that emerged spontaneously in a Bedouin village in the southern region of Israel also some seventy-five years ago. Though the two languages are of similar age, they developed under very different social conditions. ISL developed in a pidgin-like situation: people coming from different countries and bringing

with them different signing systems got together and founded a community. ABSL arose spontaneously in a community where congenital deafness became relatively wide-spread. There the transmission of the language is within and between families.

By studying sign productions of signers of different age groups in the two languages, we were able to track the development of argument structure marking devices. Our results indicate that the two languages share a basic strategy for encoding argument structure. Both languages show a marked preference towards one-argument clauses, which eliminates the need to mark the different arguments, since only one argument is associated with each verb. However, the two languages chose different paths when developing grammatical marking of argument structure: ABSL moved towards relying on word order, while ISL developed verb agreement. Examining the different stages of development and the different courses taken by the two languages provides us with some insight into how argument structure marking develops in human language.

6.1 History and social settings of two new sign languages

Israeli Sign language (ISL) evolved along with the Israeli Deaf community about seventy-five years ago, in a pidgin-like situation. The members of the first generation came from different backgrounds, both in terms of their country of origin, and in terms of their language. A few were born in Israel, and some of them went to the school for the deaf in Jerusalem that was founded in 1932, but the majority were immigrants who came to Israel from Europe (Germany, Austria, France, Hungary, Poland), and later on from North Africa and the Middle East. Some of these immigrants brought with them the sign language of their respective communities. Others had no signing, or used some kind of home sign.[2] Today, four generations of signers exist simultaneously within the Deaf community, which numbers about 10,000 members: from the very first generation, which contributed to the earliest stages of the formation and development of the language, to the fourth generation, that has acquired and further developed the modern language as a full linguistic system.

Al-Sayyid Bedouin Sign Language (ABSL) arose in a small, relatively insular and endogamous community with a high incidence of non-syndromic recessive deafness (Scott *et al.* 1995). The Al-Sayyid people settled in present-day southern Israel about two hundred years ago, and after five generations

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[2] For a description of the history of the Deaf community in Israel and the development of ISL, see Meir and Sandler (2008).

(about seventy-five years ago), four deaf siblings were born into the community. In the next two generations, deafness appeared in a number of other families resulting in what today is estimated at about 125 deaf adults, teenagers and children. The sign language that arose in the village is different in vocabulary from the sign languages of the region, ISL and Jordanian SL (Al-Fityani 2007), and in word order from ISL and the surrounding spoken languages, the local Arabic dialect and Hebrew (Sandler *et al.* 2005). ABSL is used widely in the community by both deaf and hearing members (Kisch 2000, 2004), and is seen as another language of the village in addition to spoken Arabic. The prevalent use of ABSL in the village has led to widespread exposure to the language by deaf signers and many of their hearing siblings and relatives from birth or a very young age. My colleagues Wendy Sandler, Carol Padden, and Mark Aronoff, and myself, have been privileged to study this languages for the past seven years. All the results reported here on ABSL are based on our joint work.[3]

For the purpose of this study, signers were divided into three age groups in each language. In ISL, some of the signers of the first generation are still among us, which makes it possible to observe the oldest signers of the language. In ABSL, the signers of the first generation are all deceased, and the oldest signers we have been able to work with are in their forties. Therefore the division into age groups in the two languages does not match. The oldest ISL group consists of people of the first generation of signers, and the age span of each group is about fifteen to twenty years. The oldest ABSL signers are people in their thirties and forties, and the age span of the signers in each of the younger groups is seven to ten years.

ISL: *Group 1*: Eleven signers aged 65 years and older.[4] People from this age group were not exposed to a unified linguistic system, but rather they created one through interaction with each other. Members of this group came from a variety of linguistic backgrounds. There are no ISL native signers among them, as the language was too young to acquire native users then, but seven of the eleven signers had deaf siblings or other family members. Therefore, some have used a sign language or some sort of a signing system from an earlier age.

***Group 2*:** Nine signers aged 45–65. Members of this group can be considered second generation signers, since they had linguistic models when they joined the Deaf community. Those who were born in Israel or immigrated to Israel at an early age had at least several years of schooling with other deaf

[3] See, for example, Aronoff *et al.* (2004, 2008); Sandler *et al.* (2005); Padden *et al.* (in press a).

[4] The oldest subject is 91 years old, the first member of the Association of the Deaf in Israel.

children. The daily interaction with other deaf children over a long period gave most members of this age group the opportunity to use signing from childhood. Three of the signers in this group have deaf siblings.

Group 3: Four signers aged 30–44. All members of this age group had formal schooling, and learned Hebrew, and so can be considered bilingual. Three of the four are native ISL signers.

ABSL: *Group 1*: Nine second generation signers (eight deaf, one hearing), ages 28–~45. Six are monolingual ABSL signers, two went to a school for the deaf in Beer Sheva, where they learned some Hebrew and interacted with ISL signers. Four members of this group had a deaf father. They all have deaf siblings, and had adult models of sign language, including deaf relatives such as aunts, uncles, and cousins.

Group 2: Four third generation signers, ages 17-24. All went to a school for the deaf in Beer Sheva, were taught in Hebrew and were exposed to ISL signs. Three have a deaf mother as well as deaf siblings, and the fourth has one deaf sibling. All of the younger adults interact with deaf signers of the second generation.

Group 3: Twelve children (eleven deaf, one hearing), ages 5–15. All deaf signers study in a special class for the deaf in an Arabic speaking school in Tel-Sheva, where they are taught Arabic, and are exposed to some ISL signs used by their hearing teachers. Five children have a deaf parent, and all have deaf siblings.

The next section presents the grammatical structures in sign languages relevant for argument structure marking, namely the referential system and verb agreement. After a short description of the methodology in section 6.3, we turn to examine the development of argument structure marking in the two languages. Both languages seem to develop strategies that enable them to avoid the need for argument structure marking, presented in section 6.4. Yet such strategies are cumbersome, and both languages end up developing grammatical means for encoding argument structure (section 6.5): in ABSL a consistent SOV word order emerges, while ISL develops verb agreement. The implications of the differences between the two languages are explored in section 6.6.

6.2 Relevant aspects of sign language structure: referential system and verb agreement

Sign languages differ from spoken languages in that they are produced by the hands and body in a three-dimensional space. As such, they can employ space to organize their grammar. This grammatical use of space is employed for

marking argument structure in the verbal system of sign languages. Since this mechanism is very different from verb agreement in spoken languages, it is described in some detail in this section.

Like verb agreement in spoken languages, sign language verb agreement is a grammatical system, as it involves systematic encoding of syntactic and thematic roles, as well as the referential features of the arguments on the verb. However, it is different from spoken language verb agreement in that not all the verbs in a language are marked for agreement. Padden (1988) showed that ASL has a three-way classification of verbs, according to their agreement patterns: plain, spatial, and agreement verbs. Subsequent studies found a similar classification in other sign languages as well.

Verb agreement in sign languages takes the following form: the beginning and ending points in the articulation of the agreeing verb are associated with the points in space established for the arguments of the verb. In sign languages, nominals in a clause are associated with discrete locations in space, called 'R(eferential)-loci'. This association is achieved by signing a noun and then pointing to, or directing the gaze towards, a specific point in space.[5] These R-loci are used for anaphoric and pronominal reference for the nominals associated with them, and are therefore regarded as the visual manifestation of the pronominal features of the nominals in question (see e.g. Klima and Bellugi 1979; Lillo-Martin and Klima 1990; Meier 1990; Janis 1992; Neidle *et al.* 2000).

In addition to pronouns, verbs which inflect for agreement (the so-called 'agreement verbs') also make use of the system of R-loci: their beginning and end points, as well as the direction towards which the palm (or fingertips) is facing, are determined by the R-loci of their grammatical arguments. The direction of the movement of the verb is determined by the spatial thematic role of the arguments (movement is from source to goal), and the palm faces the syntactic object (Meir 1998, 2002).[6] The system, then, involves two mechanisms: establishing associations between referents and locations in the signing space, and altering the direction of the movement and palm facing of the verb sign. These mechanisms are independent of each other, but they need to be synchronized in order for the system to operate.

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[5] Localization of referents may also be achieved by signing the noun itself in a specific location in space, if the sign is not body-anchored. For example, the sign CHILD is signed by placing 🖐 a handshape facing downwards in neutral space. If the signer places his/her hand to the right or to the left of the signing space, this location may serve as an R-locus for the particular child introduced into the discourse.

[6] This description of the mechanism of sign language verb agreement is oversimplified. For a fuller description and analysis, see Meir (2002).

The two other classes of verbs behave differently with respect to the R-loci. Plain verbs have invariant beginning and end points; the direction of the path movement of these verbs is not determined by the R-loci of their arguments. Plain verbs, then, do not make use of the system of R-loci. Spatial verbs are those whose beginning and end points are determined by spatial referents, that is, locations and not subjects or objects. The locations encoded by verbs in this class are interpreted analogically and literally, and not as representing grammatical arguments (Padden 1988).

This tri-partite classification is semantically grounded (Meir 2002). Agreement verbs denote transfer, whether concrete (as in GIVE, SEND) or abstract (as in TEACH, HELP). Spatial verbs denote motion in space, and plain verbs are defined negatively, as not involving transfer or motion. Many plain verbs denote psychological and emotional states.

Many sign languages have the verb agreement system described above, and they exhibit this tripartite division of verbs into the same categories (Meir 2002; Sandler and Lillo-Martin 2006). However, it seems that even in languages where verb agreement is quite robust, it is never completely obligatory. Signers may use non-inflected forms of agreement verbs, that is, sign forms anchored to the signer's body, moving from or towards the signer, and not between R-loci in the signing space. Or signers may use verb forms which are inflected only for one argument, the object argument. In such forms, the end point of the sign is directed towards an R-locus associated with the object argument, but the beginning point is the signer's body, even when the subject is not 1st person.[7] Therefore, while a sign language may have the full-blown system of verb agreement, there is a lot of variation in the language community, and fully agreeing forms co-exist with single-agreement forms as well as with non-inflected forms.

How does the full system develop? The examination of ISL in section 6.5 below indicates that the system does not emerge full-blown overnight (Padden *et al.* in press (b)). Moreover, it is not evident that all sign languages end up having such a system. ABSL provides an example of a sign language that relies on word order for encoding argument structure, and has not developed as yet a verb agreement system.

[7] See Meir *et al.* (2008) for a detailed description and analysis of the single agreement forms of agreement verbs.

6.3 Method: sentence production elicitation task

Since the relationship between the verb and its arguments can often be inferred from the semantics of the verb or from the context, it is important to study argument structure marking in sentences in isolation, where reliance on contextual cues is not available. As part of our study of the argument structure of ABSL and ISL, we designed a set of thirty short video clips (Aronoff *et al.* 2004; Sandler *et al.* 2005). Each clip depicts a single action carried out by either a human or an inanimate entity by itself or involving another entity. The events presented in the clips vary with respect to the number of arguments (intransitive, transitive, and di-transitive) and animacy. For our purposes here, the relevant clips are those denoting transitive and di-transitive events (eighteen clips). The transitive events varied with respect to animacy: six clips have two human arguments (e.g. a girl pulling a man), and six have a human and an inanimate argument (a girl pulling a shopping cart). The six di-transitive events all have two animate arguments and one inanimate argument (e.g. a woman giving a shirt to a man). Signers are asked to view the clips and describe the event in each clip to another signer. To check for comprehension, the addressee is asked to identify one of three pictures best corresponding to the action just described. One of the three pictures correctly depicts the action and entities involved, the second has a different subject but the same action, and the third shows the same subject performing a different action from that shown in the video. If the viewer chooses an incorrect picture, the signer is asked to repeat the description. The responses obtained from the signers in both languages, which constitute the data on which the studies reported here are based, are analysed according to the order of the constituents in the clauses, and various parameters of grammatical use of space described in section 6.5.

6.4 Emergence of argument structure: initial stages

Assuming that synchronic differences between different age groups in a language community reflect diachronic developments in the language (Labov 1994, 2001), a comparison between signers of the three age groups in ISL and in ABSL enables us to trace the development of argument structure devices from very early stages of the two languages. Our findings suggest that initially, languages 'try' to avoid marking argument structure. They develop different strategies that eliminate the need for argument structure marking. One is by showing strong preference for single argument clauses. If a clause has only one

argument, then its relationship to the verb can be inferred from the semantics of the verb. Therefore, if a language is restricted to one-argument clauses, the necessity to develop argument structure marking does not arise in the first place. Second, if the subject is by default 1st person, and the object—non-1st person, then again the assignment of syntactic roles to the arguments follows automatically from their person features. As I show shortly, both languages use the first strategy, while the second appears only in ISL.

6.4.1 *Tendency towards one-argument clauses*

When there is only one argument in a clause, the association of arguments to syntactic roles is trivial. Therefore, one way of avoiding the need to develop a mechanism for marking argument structure is by having only one-argument clauses. And indeed, we find that signers of both languages use this strategy extensively, especially when two animate/human arguments are involved. In such cases, they tend to break the event into two clauses, with two verb signs, each predicating of a different argument. Thus, an event in which a girl feeds a woman may be described as: WOMAN SIT; GIRL FEED. An event in which a man throws a ball to a girl can be rendered as: GIRL STAND; MAN BALL THROW; GIRL CATCH. This tendency is characteristic of signers of both languages. Out of all the responses describing a transitive event, in 22% of the ISL responses, and in 27% of the ABSL responses, the event was 'broken' into two one animate argument clauses. When looking only at those transitive events with two animate arguments, the percentage is higher: 33% in ISL, and 47% in ABSL.

Interestingly, the same tendency towards one-argument clauses has been reported of another new sign language, Nicaraguan Sign Language. This sign language emerged about thirty years ago, when the first school for the deaf was founded in Managua. The first group of deaf children brought to the school came from hearing families, and was not exposed to signing deaf adults. However, as they started to communicate with each other, a signing system started to emerge. The use of this system by subsequent cohorts of children who acquired it from their older peers brought about changes and developments into the language. Ann Senghas and her colleagues, who have been studying the language since its inception, report that the first cohort of children showed a strong tendency towards one-argument clauses if both arguments participating in an event are human. In fact, in their data they did not find *any* response consisting of two human nouns and a verb (Senghas *et al.* 1997:554). Typical responses were: MAN PUSH WOMAN FALL, MAN

PUSH WOMAN GET-PUSHED when describing a clip showing a man pushing a woman, and MAN CUP GIVE WOMAN RECEIVE for an event in which a man is giving a cup to a woman. In the second cohort different word orders appeared, some of which had the two verbs adjacent to each other (e.g. MAN WOMAN PUSH FALL, or MAN PUSH FALL WOMAN). However, even in the second cohort no responses consisted of two human nouns and one verb.

Three young languages, then, show a very strong preference for one-argument clauses in their initial stages.[8] An interesting parallel to this tendency can be found in the study of the history of logic.[9] Aristotelian logic and its subject-predicate schema is exclusively one-place predicate logic. This logic persisted until the nineteenth century, when Frege, coming from mathematics, introduced the notion of function, broadened this concept to include non-mathematical domains, and extended it to many-place functions (Bochenski 1961 [1970]: 323). It seems that the development of formal notation in logic mirrors the natural development of argument structure complexity in new languages.

This strategy, while efficient in terms of associating arguments with syntactic roles and avoiding ambiguities, is cumbersome. First, there is an inflation of verbs in the discourse, since every animate argument is associated with a different verb. Secondly, it is not always clear which verbs can be used to predicate the different arguments of an event. For example, in case of a seeing event, as in 'The child saw the man', what verb can be associated with the object? The only verb that comes to mind is 'be seen', so that the event is rendered as *'The child sees, the man is seen'*. This, again, creates a very 'heavy' and in a way redundant discourse.

6.4.2 Subject = 1st person

Another way to avoid the need to mark argument structure is by creating a specific association between syntactic roles and grammatical person. If the subject argument is always associated with particular person features, say 1st person, and the object is associated with another person, e.g. 2nd person, then there is no need for marking the identity of the syntactic arguments; it is derived from their association with person features.

This is clearly a very restrictive device, since it can be applied only in cases where the referential properties of the arguments match the previously

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[8] Givon (1979) argues that the tendency towards one-to-one ratio of verbs and arguments is typical of the 'pragmatic mode' of communication, which characterizes pidgins and creoles inter alia.
[9] I thank Edit Doron for this important point, and Louise Röksa-Hardy for helpful discussion on this issue.

established mapping. For example, if the mapping is stated as above, then such verb forms cannot be applied when the subject is non-1st person.

Yet some ISL signers found a way to overcome this restriction. They identify themselves with one participant, the subject, and then present the event as if subject=1st person. The following, for example, was given as a response to a clip showing a woman looking at a man:

(1)   WOMAN SIT, MAN SIT; I WOMAN, I LOOK.

The identity of the subject is introduced by forming an association between the signer (1st person) and a particular participant (WOMAN). This participant is then the subject, and the other participant is assigned the object role by implication. In some cases, the signer further identifies the object argument with the addressee, as in the following response to a clip showing a girl spoon-feeding her mother:

(2)   YOU MOTHER YOU, FEMALE I CHILD, FEED-OTHER[(2)]
      'You are the mother, I am a child, (I) feed (you).'

Notice that when the subject is 1st person, the verb form is always signed with respect to the signer's body. In case of verbs denoting transfer, the verb form either moves from the signer's body towards the addressee (when the signer is the source of transfer, as in GIVE, THROW, FEED, and SHOW), or from the addressee towards the signer (when the signer is the goal of transfer, as in TAKE). In a sense then, the signer's body in such forms is always associated with the subject argument. This association between the signer's body and the subject argument, which we termed 'body is subject' (Meir *et al.* 2007), is very pervasive in the form of verbs in sign languages. Notice that the use of space in such forms is very limited: it is restricted to the signer-addressee axis, the Z axis. R-loci located in other parts of the signing space (e.g. loci associated with third-person referents), are not incorporated into these verb forms.

This technique creates an overlap between two grammatical domains: grammatical person and syntactic role. Once the mapping is established, there is no need to further identify the arguments by special markers. Though efficient, the technique is cumbersome since the speaker has to explicitly establish the mapping for each event. While doable for sentences in isolation, it is quite impossible for a stretch of discourse. And even in sentences in isolation it is not that common: only a few of the old ISL signers (four group 1 signers and one group 2 signer) use it. Signers in the younger groups did not use it at all, nor did any of the ABSL signers.

In sum, two strategies are found in the earlier stages of ISL and ABSL: preference for one-argument clauses, and identifying subject with 1st person,

the latter found only in ISL. What characterizes these strategies is that they are not argument structure marking devices, but rather strategies that avoid argument structure marking. Since language users of earlier stages of a language cannot rely on grammatical systems, as these have not developed yet, they ingeniously devise strategies that enable mutual intelligibility in spite of the lack of formal marking devices. These are not grammatical devices per se, but rather communicative strategies. But they contain the kernels of the grammatical structures that the languages eventually develop, to which we turn in the next section.

6.5 Later developments: emergence of grammatical systems

As pointed out above, avoiding the need to mark arguments for their syntactic roles comes with a cost: the discourse created by such means is either heavy with verbs or with explicit associations between syntactic roles and person features. Discourse stretches obtained from signers of the first group in each language are actually ample with verbs, which makes them 'heavy', as often commented by younger ISL signers when looking at the signing of older signers.

But examination of the data reveals that the two languages are not 'stuck' in this initial stage. Quite quickly, though not instantaneously, they develop argument marking devices: word order and verb agreement. Word order (or, more accurately—constituent order) makes use of linear ordering of the nominals in a sentence with respect to one another, but does not involve any morphological marking. Therefore, it is predicted to appear in a language earlier than verb agreement, the latter involving two grammatical categories (syntactic roles and grammatical person) as well as morphological marking. In spoken pidgins and creoles, word order is indeed the first argument marking device to appear. But in our study of the two new sign languages, we find that they developed along different lines: in ABSL a consistent word order appeared within its second generation. In ISL, a tendency towards a consistent word order is found only in the younger group (age 30–44), but the preferred argument marking device that developed in the language is verb agreement.

6.5.1 *Word order*

6.5.1.1 *ABSL*   In our study of nine second generation signers of ABSL, we found out that a consistent SOV order emerged (Sandler *et al.* 2005; Padden *et al.* in press (a)). Though one-argument clauses by far outnumber multi-argument clauses, out of those 51 clauses containing two or more

arguments, 31 (61%) were SOV[10], 8 (16%) were SVO, and 5 (10%) were OSV. Seven of the eight SVO sentences were signed by the younger signer of the group, who has a somewhat different word order, more similar to that of younger adults.

In ABSL young adults (group 2 signers), the word order preference is changed: SVO becomes as widespread as SOV. The younger children, though, show a pattern much more similar to the adults, where SOV is predominant. The difference between the two young groups might be attributed to schooling. In the school systems, the teachers (all of whom are hearing) use a communication system called 'Signed Hebrew' or 'Signed Arabic'. In these systems, manual signs accompany the spoken language (Hebrew or Arabic), but word order is that of the spoken languages. In both Hebrew and the local Arabic dialect the basic word order is SVO. The young adults in our study were exposed to signs in an SVO order for many years, which might very well have influenced their signing. The children, with fewer years of schooling, are less affected by the Signed Arabic word order. The younger signer of group 1 also had twelve years of schooling, which might explain her preference for SVO order.

6.5.1.2 *ISL*   In group 1 ISL signers, we find no predominant word order. Both SOV and SVO order each occur in 14% of the responses. OSV occurs in 7%, and SVOV in 4%. As in ABSL, the most prevalent clause form in ISL is SV (29%). That is, there is a strong tendency towards one-argument, verb-final clauses in both languages. At the same time, there is a great deal of word order variation in ISL at that stage; 32% of the responses are orders other than SOV, SVO, or OSV. These results are in line with a study on word order in ISL conducted by Schlesinger and his colleagues in the 1970s (Namir and Schlesinger 1978: 107). The signers who participated in the study were adult users of ISL then, who would be in their sixties and seventies today, that is, group 1 signers. The study reported in the present chapter took place thirty years after the study by Schlesinger and colleagues. The parallelism between the results obtained in the two studies provides justification for the Apparent Time method on which the current study is based.

In group 2 (45–65), the percentage of SV sentences decreases to 22%, but there is still no dominant word order in sentences containing two arguments: SOV occurs in 17% of the responses, SVO in 22%. Additionally, the SVOV

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[10] This result collapses two word orders reported in Padden *et al.* (in press (a)): SOV, and SCV, where C is a complement which is not a straightforward object, such as WOMAN PAPER WRITE ('The woman wrote on a paper').

order is also becoming more wide-spread (11% of the responses). This order seems to constitute some kind of a compromise between the two dominant word orders—SOV and SVO. We do find, however, a decrease in the percentages of other word orders (25%), which may be taken as indicating a change towards more uniformity in the language.

In group 3 (age 30–44), SOV becomes the predominant order (32%), and SVOV is a bit more frequent than SVO (14% vs. 10% respectively). Other word orders reduce to 14%. There is still a large percentage of SV clauses (27%), but in this group the verbs in such clauses often inflect for agreement (in 60% of the SV productions), thus encoding the object argument morphologically, though not syntactically.

6.5.1.3 *Discussion*   In their initial stages, then, the two languages are similar in showing preference for one-argument clauses, but look very different in terms of word order: one preferred order in ABSL vs. great variation in ISL. In subsequent years, ISL becomes more homogeneous in terms of word order (see Figure 6.1). By its third generation it shows a strong preference for verb-final clauses, where SOV and SVOV are becoming the preferred orders. ABSL, in contrast, developed a strong preference for an SOV order by its second generation. This preference changes in younger signers and shows up again in children.

SOV order, then, appears in both languages. In ABSL it appears quite quickly, in the second generation. In ISL it becomes the predominant order only in the third age group, though other orders are also in use in this age group. A question that arises is—why SOV? Since the surrounding spoken
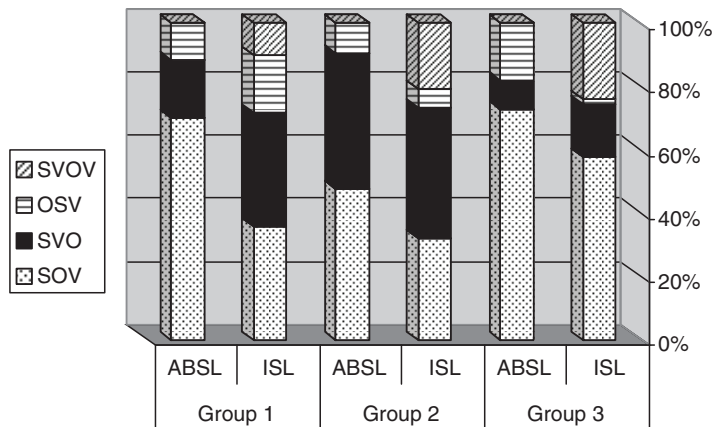

FIGURE 6.1 Proportions of use of four predominant word orders in ISL and ABSL, according to age groups.

languages, Hebrew and spoken Arabic, are SVO, and literary Arabic is VSO, the SOV order that emerged cannot be attributed to influence of the ambient spoken languages. It is also not likely that the two sign languages influenced each other. Since ABSL developed this word order more quickly than ISL, we would have to assume that the former influenced the latter. However, most ISL signers have never been in contact with ABSL signers, and have not even been aware of the existence of the language. Therefore such an influence is rather unlikely.

A different line of explanation is that SOV order is somehow more basic. Indeed, this word order is the most prevalent in the world's languages (Dryer 2005), and is assumed by some researchers to be indeed the basic order (Newmeyer 2000a). More interestingly, it has shown to emerge in cases where people invent a communication system without access to any linguistic model. Susan Goldin-Meadow and colleagues (Goldin-Meadow, So, Özyürek, and Mylander 2008) examined non-linguistic constituent order by using animated clips involving transitive actions. When asked to sort pictures representing parts of the action viewed, speakers of four different languages (English, Spanish, Turkish, and Chinese) consistently gave the order Actor-Patient-Action (that is, SOV order). In a second task, speakers were asked to convey the content of these clips by gesturing without speaking and again, a strong preference for gesture order emerged, the same Actor-Patient-Action order. When the same subjects gave spoken accounts of the animated actions, they reverted to the canonical constituent order of their languages, SVO in the three languages besides Turkish which has SOV order. These findings led Goldin-Meadow and her colleagues to conclude that SOV order reflects a natural cognitive sequencing. They hypothesize that entities are more basic than relations, hence the tendency to introduce arguments before the action. Of the two arguments involved in a transitive action, patients are more closely tied to the action, and therefore the object argument is more likely to appear in a position closer to the verb than the subject, resulting in an SOV order.

An explanation along these lines may explain the SOV order in second generation ABSL signers. Since the language arose spontaneously, with no linguistic system as a model, the word order that emerged is the more basic, default order. It is not clear, however, that it can explain the ISL word order developments, where SOV becomes predominant only in the third age group. If it is a basic cognitive order, why didn't it emerge in the first generation, when people needed a common linguistic system? The answer may be related to the different conditions that led to the development of the two languages. While ABSL arose spontaneously, ISL started off by using many different languages or communication systems. Therefore, grammatical systems are

not developed from scratch, but rather signers need to converge on a mutual system. The forces shaping this kind of a process may be different from those shaping an emerging system. I return to this point in the concluding section.

6.5.2 *Verb agreement*

Verb agreement is a grammatical mechanism which involves two grammatical categories—syntactic roles and grammatical person. In sign languages, grammatical person is built on the association of referents with spatial loci (described in section 6.2), and therefore verb agreement is built on spatial mapping. In order for a full verb agreement system to develop, several subsystems have to be in place. First, the language has to use spatial loci for representing referents, both present and non-present. Second, these loci have to be incorporated into the form of the verbs. This means that developing a full-blown verb agreement system implies dispensing with the anchoring of verb forms to the body, the 'body is subject' strategy. When the verb's path movement is not restricted to the body-inward/outward axis (the Z axis), it can move on the side-to-side axis (the X axis) to mark agreement with two 3rd person referents.

In order to examine whether the two languages developed a verb agreement system, the signers' responses were coded for the following parameters: (i) **Localization:** Responses were coded as to whether the signer established an association between a referent and a specific location in space. (ii) **Axis of the verb's path movement**: For those events that involve a linear motion in space or a transfer event, verbs were coded as to whether their path movement was on the Z axis, the X axis, or a diagonal line. (iii) **Verb agreement**: Five clips showed an event of transfer. The responses for these clips were coded as to whether the verb form shows agreement with one or two arguments. Verbs were coded as agreeing only if arguments were localized first, and the path of the verb moved between these locations.

6.5.2.1 *ABSL*   ABSL has not developed a verb agreement mechanism. First, signers rarely localize referents. Signers of the two older groups localize referents only in 12% of their responses, and children even less so (6%). This means that the spatial basis of the system is not established in the language. As for use of axes, ABSL signers strongly prefer to orient the movement relative to their own body. Of 169 verbs coded recorded for groups 1 and 2 (Padden *et al.* in press (b)), 109 or 65% moved along the Z axis. The X axis accounted for 26% and the diagonal line was used in 9% of total forms

produced. Of the verbs denoting transfer, only 8 out of 65 cases (12%) were coded as indicating agreement with 3rd person referents.

6.5.2.2 *ISL*   In ISL we find that signers of group 3 have a fully developed verb agreement system; older signers—much less so. A comparison of the three age groups on the different parameters gives us a clue as to how the system developed.

First, groups 1 and 2 differ from group 3 on the localization parameter. Signers of the two older groups localize referents in less than 30% of their responses. In other words, these signers show a strong preference for orienting verb forms with respect to their bodies, rather than moving them in space. Group 3 signers, in contrast, localize referents in almost 50% of their responses.

The two older groups look very much alike in terms of the use of axes (and very similar to ABSL signers): the Z axis is used in almost 60% of the responses, and the X axis in less than 30% of the responses. The two groups differ in the use of the diagonal: group 1 uses it only in 8% of the responses, while it appears in 16% of group 2 responses. The younger signers, 30–44 years old, show a very different pattern of axis use: the Z axis is the least used one (25%), the X axis is used extensively (42%), and the diagonal also becomes quite prevalent (32%). The use of spatial axes in the three groups is illustrated in Figure 6.2.

In group 3, almost half of the responses had double agreement forms. In these sentences, the two 3rd person referents were set in locations in space on both sides of the signer, and the verb forms moved between these two loci. Additionally, 24% of the responses marked agreement with one argument. In other words, almost 75% of the verb forms produced by signers in this group mark agreement. In the two older groups, more than half of the forms do not
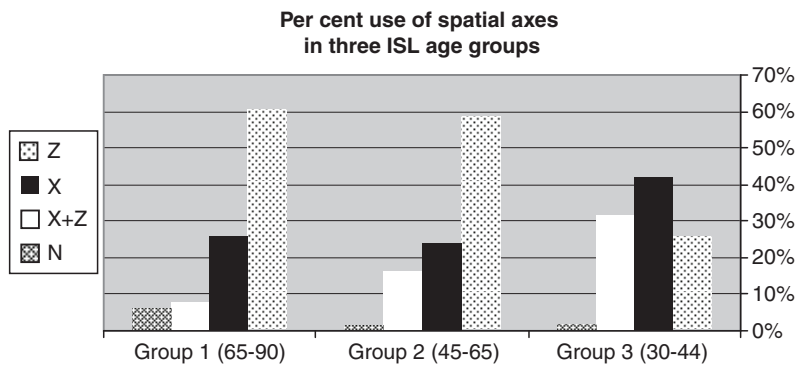

Per cent use of spatial axes in three ISL age groups

FIGURE 6.2 Per cent use of spatial axes in the three ISL age groups.

**Per cent use of verb agreement types
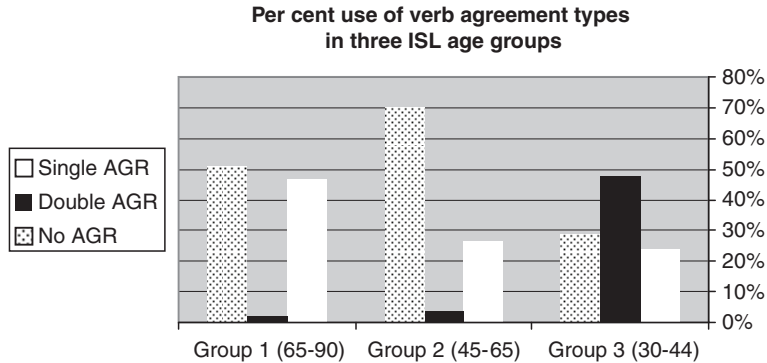in three ISL age groups**

FIGURE 6.3 Per cent use of verb agreement type in three ISL age groups.

inflect at all, and there are very few forms (2 tokens in each group) that mark agreement with both subject and object (Padden et al. in press(b)). The percentage of use of the different agreement forms in the three groups is presented in Figure 6.3.

6.5.2.3 *Discussion: the development of verb agreement*   How does verb agreement develop? When looking at sheer numbers (percentage of responses marked for agreement), it seems that verb agreement just 'popped out' suddenly in the third ISL group. However, a closer examination of the responses of the older signers reveals forms that can be regarded as precursors of verb agreement, and may give us a clue as to how the system developed.

First, in some responses signers localize referents in the signing space, but do not incorporate these locations in the form of the verb. In such responses, referents are localized to the right and to the left of the signer, but the signer still uses the Z axis in the form of the verb. The verb's path is towards or from the signer's body, not towards the loci established for the referents.[11] Such responses indicate that grammatical use of space may develop at different rates in different grammatical systems. In ISL space is used in the pronominal system before it is being incorporated into the verbal system.

How do spatial loci get incorporated into the verbal system? Two types of what seem to be intermediate steps between non-agreeing and fully agreeing forms are found in the data. First, one signer introduced an 'auxiliary' sign that moves between the R-loci, while the verb does not inflect for agreement. As a response for a clip showing a man throwing a ball to a girl, the signer localized

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[11] A similar phenomenon is found also in ABSL (see Aronoff *et al.* 2004).

(a)   (b)

FIGURE 6.4 (a) Double agreement form (on the X axis) and (b) single agreement form (on the diagonal) of the ISL verb GIVE ('3rd person gives to 3rd person')

the referents by using the sign STAND in two different locations in space. She then signed an uninflected form of verb THROW, using the Z axis, after which she added a sign tracing the path of the ball moving from the R-locus of the subject to that of the recipient object. Such a form can be regarded as a compromise between the two competing strategies: the verb maintains its 'body as subject' form, while the referential system is incorporated into the form of a non-verbal sign indicating the path of transfer. Interestingly, there are sign languages that use similar auxiliary signs to indicate subject and object in non-agreeing verbs.[12] ISL did not end up adopting this grammatical mechanism.

Single agreeing forms constitute a different type of an intermediate step between non-agreeing and fully agreeing verbs. In such forms, the sign's initial location is on the body, and its end point is directed towards a spatial locus associated with the object argument. In other words, one end of the sign is body-anchored, and does not encode grammatical person, while the other moves in space and encodes the referential features of the object argument (see Figure 6.4). A possible scenario for the development of such forms is the following:[13] verbs of transfer usually have a path movement, from the signer's body outside (or inside towards the body when subject is goal, as in TAKE). If the addressee is a participant in the event, then the verb can be interpreted as directed towards the addressee, and consequently, the verb's final location can be re-analysed as

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[12] E.g. Sign Language of the Netherlands, Bos, 1994; Japanes Sign Language, Fischer, 1996; Brazilian Sign Language, Quadros, 1999; Taiwan Sign Language, Smith, 1990.

[13] This explanation was suggested to me by Ann Senghas (personal communication).

associated with the addressee. Once this reanalysis occurs, it can be generalized to third person referents that are present in the signing situation. The verb's path is directed towards their actual location, resulting in a diagonal path. Then it is only a short step to directing the verb towards loci associated with non-present referents, and analysing the final location of the verb as encoding the referential features of that argument. Such forms, then, actually agree with the (recipient) object argument, and are produced on the diagonal line.

The process described here can be regarded as reanalysis of the verb's final location, from a phonological component of the sign into an agreement morpheme. Of the mechanisms introduced by signers of group 1 for encoding argument structure (e.g. introducing an auxiliary sign, associating subject with 1st person and word order), ISL seems to have adopted the single-agreeing forms as a step towards a full verb agreement system. This is the only parameter over which group 1 and group 2 differ. Group 2 signers use the diagonal line twice as often (16% vs. 8%) as group 1 signers.

Two additional steps have to take place in order for a full verb agreement system to develop: the other end of the sign has to be reanalysed as an agreement morpheme as well, and the body has to be dissociated from representing the subject. These steps did not occur systematically in the two older groups. Apparently, dissociating the verb form from the body takes time. But once such a mechanism finds its way into the language, the change spreads quite quickly, as the prevalent use of verb agreement in group 3 indicates.

6.6 Conclusion

ABSL and ISL start off by sharing a basic strategy—a preference for one-argument clauses. Yet they show different courses of development in terms of the argument structure mechanism they adopt. ABSL came to rely mainly on word order to indicate syntactic roles. This mechanism developed within the span of one generation. ISL, on the other hand, did not develop a preferred word order until its third age group, which is also when a full blown verb agreement system showed up. This difference between the two languages indicates that there is no one universal path for the development of argument structure marking. Languages may differ in that respect from very early stages of their existence.

ISL also shows that word order does not necessarily predate verb agreement in the life of a single language. This contrasts with what has been claimed for new spoken languages. In pidgins and creoles, the main strategy to indicate syntactic roles is by word order (Hymes 1971), while verb agreement takes much longer to develop. This difference between ISL and pidgins and creoles

might be attributed to modality differences, as argued in Aronoff, Meir, and Sandler (2005). Agreement morphemes in spoken languages are often the result of grammaticalization of free personal pronouns (see e.g. Givón 1971, 1976; van Gelderen 2007). Grammaticalization results from various processes of language change, such as reanalysis, extension, phonological erosion, borrowing, and semantic bleaching, which may occur independently or in various combinations (Joseph 2000; Newmeyer 2000b). In order for a lexeme to turn into a grammatical affix, some combination of these processes must occur—typically, over time. Sign language verb agreement, in contrast, is not the result of morphologization of free words, but rather develops when a sign language recruits space in the service of its grammar.[14] The spatial nature of sign languages allows them to represent certain grammatical notions (such as source and goal) in an iconic, transparent way. Since the verb agreement system is motivated and not fully arbitrary, it follows a quicker course of development than the overt inflectional morphology of spoken languages, and may precede the development of a consistent word order in these languages.

Is there any explanation for the differences between ISL and ABSL? The most simplistic answer is that languages may vary as to the grammatical devices they adopt, for no particular reason. Languages vary as to the morphological type they belong to (inflectional vs. agglutinating, for example), the particular word order they adopt, and also the particular argument structure marking strategy they develop.

Another possible line of explanation attributes at least some of these differences to the different socio-linguistic conditions under which each language emerged and developed. ISL developed in a pidgin-like situation, where people with different signing systems came together and formed a community. Not all the basic language ingredients had to be invented from scratch, since at least some of the members of the first generation used other sign languages which they brought with them from their lands of origin. The first generation of ISL was characterized by immense variety in terms of the grammatical devices employed by different people. ABSL developed under very different circumstances. People did not come together to form a community, but rather were born into a community. Yet that community did not have any sign language as a linguistic model. Therefore, any linguistic

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[14] Therefore, sign language verb agreement shows that it is not always the case that 'Today's morphology is yesterday's syntax' (Givón 1971). Inflectional morphology may develop by means other than grammaticalization of free morphemes. I thank Edit Doron for this point.

mechanism had to be invented or built on linguistic building blocks that already developed in the emerging linguistic system.

Verb agreement takes time to develop, because it involves encoding two grammatical categories, and freeing verb forms from being body-anchored. ISL started off with more variety, that is, more possibilities to choose from. The kernels of grammatical use of space can be found in the 'subject=1st person' device, and in the spatial mapping that some signers use quite extensively. So it is possible that ISL did not have to come up with a totally new mechanism, but rather to choose from several existing options, and expand on these. ABSL signers, on the other hand, had to develop all the components of the system from scratch, which might slow down considerably the emergence of a verb agreement system. It might also be the case that ABSL will not develop verb agreement at all. If one sub-part of the system does not find its way into the language (e.g. if signers do not systematically establish R-loci for non-present referents), then the verb agreement system found in many sign languages and described in section 6.2 cannot develop.

This line of thought may also explain why ISL took much longer to develop preferred word order. The wide variety of orders found in the first generation made it more difficult to home in on a particular order within a short span of time. The second age group exhibits less variation than the first group, but it is only in the third age group that the language community is homogeneous enough for a specific order to become predominant. Interestingly, this word order is SOV, the same order found in group 2 ABSL signers, and the one argued to be a basic cognitive order (Goldin-Meadow *et al.* 2008). It may be the case that this order did not emerge in the first and second generations, because some signers still relied on the linguistic systems they brought with them. It is only in the third generation, which was much less exposed to other signing systems, and has more native signers, that this order becomes the preferred one, though other orders are still quite frequent as well. It must be concluded, then, that the processes of developing grammatical structures de novo and in a pidgin-like situations are different, and may result in different linguistic structures in the languages.

The approach laid out here assumes that the social conditions under which a language develops interacts with the development of its linguistic structure. Sign languages are crucial for developing and evaluating such approaches. Because of their young age, the social conditions and histories of their communities are relatively known, and their linguistic development is observable from very early stages. Furthermore, new sign languages develop under two distinct settings: within small communities or villages where transmission is within and between families as in ABSL, and in pidgin-like

situations where unrelated signers of different backgrounds are brought together in locations such as cities or schools, exemplified here by ISL. The visual modality, that affords sign languages with the possibility to exploit iconicity in certain aspects of their grammars, allows some grammatical structures to arise more quickly, as discussed above. All of these factors make new sign languages a perfect natural laboratory for studying the development of linguistic structure and its interaction with the nature of the language community.