SIGN LANGUAGE: AN OVERVIEW
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In many ways, sign languages are like spoken languages: they are natural languages that arise spontaneously wherever there is a community of communicators; they effectively fulfill all the social and mental functions of spoken languages; and they're acquired without instruction by children, given normal exposure and interaction. These characteristics have led many linguists to expect sign languages to be similar to spoken languages in significant ways. But sign languages are different too: as manual-visual languages, sign languages exploit a completely different physical medium from the vocal-auditory system of spoken languages. These two dramatically different physical modalities are also likely to have an effect on the structure of the languages through which they are transmitted.

It is of special interest, then, to compare natural languages in the two modalities. Where the two systems converge, universal linguistic properties are revealed. Where they diverge, the physical medium of transmission is implicated, and its contribution to the form of language in both modalities illuminated. Neither can be seen quite so clearly if linguists restrict their study to spoken language alone (or to sign language alone). For this and other related reasons, it is often remarked that sign languages provide us with a natural laboratory for studying the basic characteristics of all human language.

Once the existence of natural language in a second modality is acknowledged, questions like the following arise: How are such languages born? Are the central linguistic properties of sign languages parallel to those of spoken languages? Is sign language acquired by children in the same stages and time frame in which hearing children acquire spoken language? Are the same areas of the brain responsible for language in both modalities? What role does modality play in structuring language? In other words, within the architecture of human cognition, do we find the structure of one language 'faculty' or two? While there is no conclusive answer to this deceptively simple question, an impressive body of research has greatly expanded our understanding of the issues underlying it.

HOW DO SIGN LANGUAGES 'HAPPEN'?

Evolution made language possible scores of millennia ago, and there is no human community without it. What sign language teaches us is that humans have a natural propensity for language in two different modalities: vocal-auditory and manual-visual. Since the human ability to use language is so old, and since speech is the predominant medium for its transmission, it seems that spoken languages themselves are either also very old or are descended from other languages with a long history. But sign languages do not have the same histories as spoken languages because special conditions are required for them to arise and persevere, and for this reason they can offer unique insight into essential features of human language.

The first lesson sign language teaches us is that, given a community of humans, language inevitably emerges. While we have no direct evidence of the emergence of any

spoken language, we can get much closer to the origin of a sign language, and, in rare instances, even watch it come into being.

Wherever deaf people have an opportunity to gather and interact regularly, a sign language is born. Typically, deaf people make up a very small percentage of the population (about 0.23% in the United States, according to the National Center for Health Statistics, 1994), so that in any given local social group, there may be no deaf people at all or very few of them. The most common setting in which a deaf community can form, then, is a school for deaf children. Such schools only began to be established about two hundred years ago in Europe and North America. On the basis of this historical information and some reported earlier observations of groups of people using sign language, it is assumed that the oldest extant sign languages do not date back farther than about 300 years (Woll et al, 2001). Currently, linguists have the rare opportunity to observe the emergence and development of a sign language from the beginning in a school established in Nicaragua only about 25 years ago, an opportunity that is yielding very interesting results.

Graduates of such schools sometimes choose to concentrate in certain urban areas, and wider communities arise and grow, creating their own social networks, institutions, and art forms, such as visual poetry (Sutton Spence and Woll, 1999; Padden and Humphries, in press; Sandler and Lillo-Martin, in press). Deaf society is highly developed in some places, and the term 'Deaf' with a capital D has come to refer to members of a minority community with its own language and culture, rather than to people with an auditory deficit.

It is not only the genesis of a sign language that is special; the way in which it is passed down from generation to generation is unusual as well. Typically, fewer than 10% of deaf children acquire sign language from deaf parents, and of those deaf parents, only a small percentage are themselves native signers. The other 90+% of deaf children have hearing parents and may only be exposed to a full sign language model when they get to school. These social conditions taken together with certain structural properties of sign languages have prompted some linguists to compare them to spoken creoles (Fischer, 1978).

Another way in which a deaf social group and concomitant sign language can form is through the propagation of a genetic trait within a small village or town through consanguineous marriage, resulting in a proportionately high incidence of deafness, and the spread of the sign language among both deaf and hearing people. Potentially, this kind of situation can allow us to observe the genesis and development of a language in a natural community setting. Though the existence of such communities has been reported here and there (see especially Groce, 1985), no detailed linguistic study of a language arising in such a community has yet been provided.

These, then, are the ways in which sign languages happen. The existence of many sign languages around the world -- the number 103 found in the Ethnologue database is probably an underestimate – confirms the claim that the emergence of a highly structured communication system among humans is inevitable. If the oral-aural channel is unavailable, language springs forth in the manual-visual modality.

Not only does such a system emerge in the absence of audition, but its kernels can be observed even in the absence of both a community and a language model. Deaf children who live in hearing households where only oral language is used, who have not yet experienced speech training, and thus have no accessible language model, devise their own systematic means of communication called home sign, studied in exquisite detail by Goldin-Meadow and her colleagues (Goldin-Meadow, 2003). The gesture talk of these children contains the unmistakable imprint of a real linguistic system, and as such it offers a unique display of the fundamental human genius for language.

At the same time, the form and content of home sign are rudimentary, and do not approach the richness and complexity of a language used by a community, spoken or signed. This confronts us with another important piece of information: language as we know it is a social phenomenon. Although each brain possesses the potential for language, it takes more than one brain to create a complex linguistic system.

THE LINGUISTIC STRUCTURE OF SIGN LANGUAGE

Hearing people use gesture, pantomime, and facial expression to augment spoken language. Naturally, the ingredients of these forms of expression are available to sign languages too. The apparent familiarity of the raw material that contributes to the formation of sign languages has led many a naïve observer to the mistaken assumption that sign languages are actually simple gesture systems. However, instead of forming an idiosyncratic, ancillary system like the one that accompanies speech, these basic ingredients contribute to a primary linguistic system in the creation of a sign language, a system with many of the same properties found in spoken languages. In fact, linguistic research has demonstrated that there are universal organizing principles that transcend the physical modality, subsuming spoken and signed languages alike.

The phonology of sign language

William Stokoe (1960) demonstrated that the signs of American Sign Language (ASL) are not gestures: they are not holistic icons. Instead, Stokoe (1960) showed that they are comprised of a finite list of contrastive meaningless units like the phonemes of spoken languages. These units combine in constrained ways to create the words of the language. While some differences have turned up among different sign languages in their phonological inventories and constraints, there are many common properties, and the generalizations presented here hold across sign languages, unless otherwise indicated.

Stokoe established three major phonological categories: hand shape, location, and movement. Each specification within each of the three major categories was treated as a phoneme in Stokoe's work. Later researchers accepted these categories, but proposed that the specifications within each category function not as phonemes but as phonological features. The ASL signs SICK and TOUCH, illustrated in **Figure 1**, have the same hand shape and the same straight movement. They are distinguished by location only: the location for SICK is the head, while the location for TOUCH is the non-dominant hand. Minimal pairs such as this one, created by differences in one feature only, exist for the features of hand shape and movement as well. While the origins of these and other (but

certainly not all) signs may have been holistic gestures, they have evolved into words in which each formational element is contrastive but meaningless in itself.
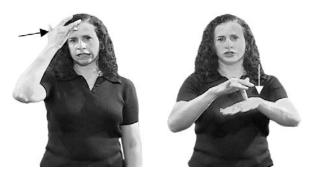

Figure 1. ASL minimal pair distinguished by location feature.

a. SICK and b. TOUCH

Two other defining properties of phonological systems exist in sign languages as well: constraints on the combination of phonological elements, and rules that systematically alter their form. One phonological constraint on the form of a (mono-morphemic) sign concerns the set of two-handed signs. If both hands are involved, and if both hands also move in producing the sign (unlike TOUCH above, in which only one hand moves), then the two hands must have the same hand shape, and the same (or mirror) location and movement (Battison, 1978). An example is DROP, pictured in **Figure 2b**: both hands move, and they are identical in all other respects as well**.** The second defining property, changes in the underlying phonological form of a sign, is exemplified by hand shape assimilation in compounds. In the lexicalized ASL compound, MIND+DROP=FAINT, the hand shape of the first member, MIND, undergoes total assimilation to the hand shape of the second member, DROP, as shown in **Figure 2.**

Figure 2. Hand configuration assimilation in the ASL compound,

a.   MIND+b. DROP=c. FAINT

Stokoe believed that handshapes, locations, and movements co-occur simultaneously in signs, an internal organization that differs from the sequentiality of consonants and vowels in spoken language. Liddell (1984) took exception to that view, showing that there is phonologically significant sequentiality in this structure. Sandler (1989) further refined that position, arguing that the locations (L) and movement (M) within a sign are sequentially ordered, while the hand configuration (HC) is autosegmentally associated to these elements -- typically, one hand configuration (i.e., one hand shape with its orientation) to a sign, as shown in the representation in **Figure 3**. The first location of the sign TOUCH in **Figure 1b**, for example, is a short distance above the non-dominant hand; the movement is a straight path; and the second location is in contact with the non-dominant hand. The hand shape of the whole sign is .
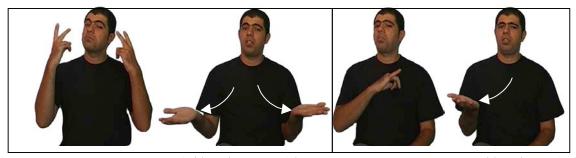
```
        HC
       /|\
      L M  L
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Figure 3. The canonical form of a sign (Sandler, 1989)

Under assimilation, as in **Figure 2**, the HC of the second member of the compound spreads regressively to the first member in a way that is temporally autonomous with respect to the Ls and Ms, manifesting the autosegmental property of stability (Goldsmith, 1979). The sequential structure of signs is still a good deal more limited than that of words in most spoken languages, however, usually conforming to this canonical LML form even when the signs are morphologically complex (Sandler, 1993).

Morphology

All established sign languages studied to date, like the overwhelming majority of spoken languages, have complex morphology. First, as shown above in **Figure 2.**, compounding is very common. In addition, some sign languages have a limited number of sequential affixes. For example, Israeli Sign Language (ISL) has a derivational negative suffix, similar in meaning to English *–less*, that was grammaticalized from a free word glossed NOT-EXIST. This suffix has two allomorphs, depending on the phonological form of the base, illustrated in **Figure 4**. If the base is two-handed, so is the suffix, while one-handed bases trigger the one-handed allomorph of the suffix.

a. IMPORTANT-NOT-EXIST (without importance) b. INTERESTING-NOT-EXIST (without interest)

Figure 4. Allomorphs of an ISL suffix.

Sign languages typically have a good deal of complex morphology, but most of it is not sequential like the examples in **Figures 3** and **4**. Instead, signs gain morphological complexity by simultaneously incorporating morphological elements (Fischer and Gough, 1978). The prototypical example, first described in detail in ASL (Padden, 1988) but apparently found in all established sign languages, is verb agreement. This inflectional system is prototypical not only because of the simultaneity of structure involved, but also because of its use of space as a grammatical organizing property.

The system relies on the establishment of referential loci – points on the body or in space that refer to referents in a discourse – which might be thought of as the scaffolding of the system. In **Figure 5**, loci for first person and third person are established.

Figure 5. Referential loci. a. first person. b. third person.

In the class of verbs that undergoes agreement, the agreement markers correspond to referential loci established in the discourse. Through movement of the hand from one locus to the other, the subject is marked on the first location of the verb, and the object on the second. **Figure 6a** shows agreement for the ASL agreeing verb, ASK, where the subject is first person and the object is third person. **Figure 6b** shows the opposite: third person subject and first person object. The requirement that verb agreement must refer

independently to the first and last locations in a sign was one of the motivations for Liddell's (1984) claim that signs have sequential structure.

Figure 6. Verb agreement. a. 'I ask him/her.' b. 's/he asks me.'

Although each verb in **Figure 6** includes three morphemes, each still conforms to the canonical LML form shown in **Figure 3**. The agreement markers are encoded without sequential affixation. Sign language verb agreement is a linguistic system, crucially entailing such grammatical concepts as coreference, subject and object, singular and plural. It is also characterized by sign language-specific properties, such as the restriction of agreement to a particular class of verbs (Padden, 1998), identified mainly on semantic grounds (Meir, 2002).

Another productive inflectional morphological system found across sign languages is temporal and other aspectual marking, in which the duration of Ls and Ms, the shape of the movement path, or both may be altered, and the whole form may be reduplicated, to produce a range of aspects, such as durational, continuative, and iterative (Klima and Bellugi 1979). This system has templatic characteristics, lending itself to an analysis that assumes CV-like LM templates and nonlinear associations of the kind McCarthy (1981) proposed for Semitic languages (Sandler, 1989, 1990).

Figure 4 demonstrated that some limited sequential affixation exists in sign languages. However, the most common form of sign language words by far, whether simple or complex, is LML (setting aside gemination of Ls and Ms in the aspectual system, which adds duration but not segmental content). In fact, even lexicalized compounds such as the one shown in **Figure 2** often reduce to this LML form. If movement (M) corresponds to a syllable nucleus in sign language, as Perlmutter (1992), Brentari (1998), and others have argued, then it appears that monosyllabicity is ubiquitous in ASL (Coulter, 1982) and in other sign languages as well. In the midst of a morphological system with many familiar linguistic characterstics – e.g., compounding, derivational morphology, inflectional morphology, allomorphy – we see in the specific preferred monosyllabic form of sign language words a clear modality effect (Sandler & Lillo-Martin, in press).

No overview of sign language morphology would be complete without a description of the classifier subsystem. This subsystem is quintessentially 'sign

language', exploiting the expressive potential of two hands forming shapes and moving in space, and molding it into a linguistic system (Supalla, 1986; Emmorey, 2003). Sign languages use classifier constructions to combine physical properties of referents with the spatial relations among them and the shape and manner of movement they execute. In this subsystem, there is a set of hand shapes which classify referents in terms of their size and shape, semantic properties, or other characteristics, in a classificatory system that is reminiscent of verbal classifiers found in a variety of spoken languages (Senft, 2002). These hand shapes are the classifiers that give the system its name. An example of a classifier construction is shown in **Figure 7**. It describes a situation in which a person is moving ahead, pulling a recalcitrant dog zig-zagging behind. The hand shape embodies an upright human classifier, and the hand shape a legged creature.

Figure 7. classifier construction in ASL

What is unusual about this subsystem is that each formational element – the hand shape, the location, and the movement – has meaning. That is, each has morphological status. This makes the morphemes of classifier constructions somewhat anomalous, since sign language lexicons are otherwise built of morphemes and words in which each of these elements is meaningless and has purely phonological status. Furthermore, constraints on the cooccurrence of these elements in other lexical forms do not hold on classifier constructions. In **Figure 7**, for example, the constraint on interaction of the two hands described in the section on phonology is violated. Zwitserlood (2003) suggests that each hand in such classifier constructions is articulating a separate verbal constituent, and that the two occur simultaneously – a natural kind of structure in sign language and found universally in them, but one that is inconceivable in spoken language. Once again, sign language presents a conventionalized system with linguistic properties, some familiar from spoken languages, and some modality-driven.

Syntax
        As in other domains of linguistic investigation, the syntax of sign languages displays a large number of characteristics found universally in spoken languages. A key

example is recursion – the potential to repeatedly apply the same rule to create sentences of ever increasing complexity – argued to be the quintessential linguistic property setting human language apart from all other animal communication systems (Hauser, Chomsky, and Fitch, 2002). Specifically, through embedding or conjoining, recursion can result in sentences of potentially infinite length. These two different ways of creating complex sentences have been described and distinguished from one another in American Sign Language. For example, a process that tags a pronoun that is co-referential with the subject of a clause onto the end of a sentence may copy the first subject in a string only if the string contains an embedded clause, but not if the second clause is coordinate (Padden 1988). In example (1), the subscripts stand for person indices marked through verb agreement, and INDEX is a pointing pronominal form, here a pronoun copy of the matrix subject, MOTHER. (These grammatical devices were illustrated in **Figures 5** and **6** above.)

(1)   a. MOTHER SINCE $_i$PERSUADE$_j$ SISTER $_j$COME$_i$ $_i$INDEX
            'My mother has been urging my sister to come and stay here, she (mother) has.'

        b. * $_i$HIT$_j$ $_j$INDEX TATTLE MOTHER $_i$INDEX.
            'I hit him and he told his mother, I did.'

        The existence of strict constraints on the relations among nonadjacent elements and their interpretation is a defining characteristic of syntax. A different category of constraints of this general type concerns movement of constituents from their base generated position, such as the island constraints first put forward by Ross (1967) and later subsumed by more general constraints. One of these is the WH island constraint, prohibiting the movement of an element out of a clause with an embedded WH question. The sentence, *Lynn wonders [what Jan thinks]* is okay, but the sentence **It's Jan that Lynn wonders [what __ thinks]* is ruled out. Lillo-Martin (1991) demonstrated that ASL obeys the WH island constraint with the sentences shown in example (2). Given the relative freedom of word order often observed in sign languages such as ASL, it is significant that this variability is nevertheless restricted by universal syntactic constraints.

(2)   a. PRO DON'T-KNOW ["WHAT" MOTHER LIKE].
            'I don't know what Mom likes.'

            _____t
        b. MOTHER, PRO DON'T KNOW ["WHAT" ___ LIKE].
             * 'As for Mom, I don't know what likes.'

The line over the word MOTHER in (2b) indicates a marker that is not formed with the hands, in this case a backward tilt of the head together with raised eyebrows, marking the constituent as a topic (t) in ASL. There are many such markers in sign languages, which draw from the universal pool of idiosyncratic facial expressions and body postures

available to all human communicators, and which become organized into a grammatical system in sign languages.

A grammar of the face

When language is not restricted to manipulations of the vocal tract and to auditory perception, it is free to recruit any parts of the body capable of rapid, variegated articulations that can be readily perceived and processed visually, and so it does. All established sign languages that have been investigated use non-manual signals – facial expressions and head and body postures -- grammatically. These expressions are fully conventionalized and their distribution is systematic.

Early research on ASL showed that certain facial articulations, typically of the mouth and lower face, function as adjectivals and as manner adverbials, the latter expressing such meanings as 'with relaxation and enjoyment', and 'carelessly' (Liddell, 1980). Other sign languages have been reported to use lower face articulations in similar ways. The specific facial expressions and their associated meanings vary from sign language to sign language. **Figure 8** gives examples of facial expressions of this type in ASL, ISL and British Sign Language, resp.

Figure 8. a. ASL 'with relaxation and enjoyment b. ISL 'carefully' , and c. BSL 'exact'

A different class of facial articulations, particularly of the upper face and head, predictably co-occur with specific constructions, such as yes/no questions, WH questions, and relative clauses in ASL and in many other sign languages as well. Examples from ISL shown in **Figure 9a** illustrate a yes/no question (raised brows, wide eyes, head forward), **9b** a WH question (furrowed brows, head forward), and **9c** the facial expression systematically associated in that language with information designated as 'shared' for the purpose of the discourse (squinted eyes). While some of these facial articulations may be common across sign languages (especially those accompanying yes/no and WH questions), these expressions are not iconic. Some researchers have proposed that they evolved from more general affective facial expressions associated with emotions. In sign languages, however, they are grammaticalized, and formally distinguishable from the affective kind that signers, of course, also use (Reilly, McIntire, and Bellugi, 1990).

Figure 9. ISL a. yes/no question, b. WH question, and c. 'shared information'

Observing that non-manual signals of the latter category often cooccur with specific syntactic constructions, Liddell (1980) attributed to them an expressly syntactic status in the grammar of ASL, a view that other researchers have adopted and expanded (e.g., Petronio and Lillo-Martin 1997; Neidle, **Kegl, MacLaughlin, Bahan, & Lee,** 2000). A competing view proposes that they correspond to intonational tunes (Reilly, McIntire and Bellugi, 1990) and participate in a prosodic system (Nespor and Sandler, 1999). Wilbur (2000) presents evidence that non-manuals convey many different kinds of information -- prosodic, syntactic, and semantic. A detailed discussion can be found in Sandler and Lillo-Martin (in press).

ACQUISITION OF SIGN LANGUAGE

Nowhere is the 'natural laboratory' metaphor more appropriate than in the field of sign language acquisition. This area of inquiry offers a novel and especially revealing vantage point from which to address weighty questions about the human capacity for language. Research has shown, for example, that children acquire sign language without instruction, just as hearing children acquire spoken language, and according to the same timetable (Newport and Meier, 1985). These findings lend more credence to the view, established by linguistic research on the adult system, that languages in the two modalities share a significant amount of cognitive territory; children come equipped for the task of acquiring language in either modality equally.

Studies have also shown that signing children attend to grammatical properties, decomposing and over-generalizing them as they advance through the system, sometimes even at the expense of the iconic properties inherent in that system. For example, even the pointing gesture used for pronouns (see **Figure 5**) is analyzed as an arbitrary grammatical element by small children, who may go through a stage in which they make mistakes, pointing at 'you' to mean 'me' (Pettito, 1987). Meier (1991) discovered counter-iconic errors in verb agreement (see **Figure 6**), similarly indicating that children are performing a linguistic analysis, exploring spatial loci as grammatical elements and not as gestural analogues to actual behavior and events.

Due to the social conditions surrounding its acquisition, sign language lends novel insight into two key theories about language and its acquisition: the critical period hypothesis and the notion that the child makes an important contribution to the crystallization of a grammar. Some deaf children are raised in oral environments, gaining access to sign language later in life. Studies comparing the ASL performance of early and

late learners found that the age of exposure is critical for acquisition of the full grammatical system (Newport, 1990) and its processing (Mayberry and Eichen, 1991), providing convincing support for Lenneberg's (1967) critical period hypothesis. An untainted perspective on the child's contribution can be gained where the input to the child is simpler and/or less systematic than a full language system, as with pidgins (Bickerton, 1981). Researchers of the sign language that originated in the Nicaraguan school mentioned earlier studied the communication system conventionalized from the home sign brought to the school by the first cohort of children. This system served as input to the second cohort of children under the age of 10 who later arrived at the school. Comparing the language of the two cohorts, the researchers found that children make an important contribution: the second cohort of signers developed a significantly more structured and regular system than the one that served as their input (Kegl, Senghas, and Coppola, 1999; Senghas, Kita, and Ozyurek, 2004).

SIGN LANGUAGE AND THE BRAIN

Broadly speaking, it is established that most spoken language functions involve extensive activity in specific areas of the left hemisphere of the brain, while much of visuo-spatial cognition involves areas of the right cerebral hemisphere. Therefore, the discovery that sign language, like spoken language, is primarily controlled by the left hemisphere is striking and significant (Poizner, Klima, and Bellugi, 1987; Emmorey, 2002). Various explanations for left hemisphere dominance for language are currently on the table, such as the more general ability of the left hemisphere to process rapidly changing temporal events (Fitch, Miller, and Tallal, 1997). This explanation has been rejected for sign language by some researchers on the grounds that sign language production is slower than that of spoken language (Hickock, Klima, and Bellugi, 1996). Whatever explanation is ultimately accepted, Emmorey (2002) and others argue that similarities in the kind of cognitive operations inherent in the organization and use of language in the two modalities should not be ignored in the search.

While most language functions are controlled by the left hemisphere, some do show right hemisphere involvement or advantage. With respect to sign language, there is some evidence that the right hemisphere may be more involved in producing and comprehending certain topographic/spatial aspects of sign language, in particular those involving classifier constructions (Emmorey, Damasio, McCullough, Grabowski, Ponto, Hichwa, and Bellugi, 2002). While this result sits well with the known right hemisphere advantage for spatial processing, it is made even more interesting when added to discoveries of right hemisphere dominance for certain other spoken and sign language functions that may be related to the classifier system, such as processing words with imageable, concrete referents (Day, 1979; Emmorey and Corina, 1993). Findings such as these are an indication of the way in which sign language research adds important pieces to the puzzle of language organization in the brain.

LANGUAGE MODALITY, LANGUAGE AGE, AND THE DINNER CONVERSATION PARADOX

A large body of research, briefly summarized above, attributes to sign languages essential linguistic properties that are found in spoken languages as well (Sandler and Lillo-Martin, in press). Also, like different spoken languages, sign languages are not mutually intelligible. A signer of Israeli Sign Language observing a conversation between two signers of American Sign Language will not understand it. While cross sign language research is in its infancy, some specific linguistic differences from sign language to sign language have already been described.

At the same time, there is a rather large group of predictable similarities across sign languages and, as Newport and Supalla (2000:109) put it, "… a long dinner among Deaf users of different sign languages will, after a while, permit surprisingly complex interchanges…." Here we find a difference between signed and spoken languages: one would hardly expect even the longest of dinners to result in complex interchanges among monolingual speakers of English and Mandarin Chinese. While it is already clear that more differences across sign languages will be uncovered with more investigation and more sophisticated research paradigms, it is equally certain that the dinner conversation paradox will persist. Two reasons have been suggested for cross sign language similarities: the effect of modality on language structure, and the youth of sign languages.

Modality effects

Modality is responsible for two interwoven aspects of sign language form, both of which may contribute to similarities across sign languages: an iconic relation between form and meaning, and simultaneity of structure. Because the hands can represent physical properties of concrete objects and events iconically, this capability is abundantly exploited in sign languages, both in lexical items, and in grammatical form. While spoken languages exhibit some iconicity in onomatopoeia, ideophones, and the like, the vocal-auditory medium does not lend itself to direct correspondence between form and meaning, so that the correspondence in spoken language is necessarily more arbitrary.

Iconicity in sign language

Leafing through a sign language dictionary, one immediately notices the apparent iconicity of many signs. An example is the ISL sign for BOOK, shown in **Figure 10**, which has the appearance of a book opening.

Figure 10. An iconic sign: (ISL) BOOK

While clearly widespread, iconicity in sign language must be understood in the right perspective. Many signs are not iconic or not obviously motivated, among them the signs for abstract concepts that exist in all sign languages. Interestingly, even the iconicity of signs that are motivated is not nearly so apparent to non-signers if the translations are not available (see Klima & Bellugi, 1979). In addition, the presence of iconicity in sign language does not mean that their vocabularies are overwhelmingly similar to one another. In fact, while even unrelated sign languages have some overlap in vocabulary due to motivatedness, their vocabularies are much more different from one another than one might expect (Currie, Meier, and Walters, 2002).   Nevertheless, the kind of symbolization and metaphoric extension involved in creating motivated signs may be universal (Taub, 2001). A bird is represented in ISL with a sign that looks like wings, and in ASL with a sign that looks like a beak, for example, and experience with this kind of symbolization in either sign language may make such signs easier to interpret in the other.

Simultaneity in sign languages

Another modality feature is simultaneity of structure, alluded to in the Phonology and Morphology sections. Some researchers have argued that constraints on production, perception, and short-term memory conspire to create simultaneity of linguistic structure (e.g., Bellugi and Fischer, 1972; Emmorey, 2002). Interestingly, iconicity also makes a contribution to simultaneity of structure, especially when one looks beyond the lexicon to grammatical forms of a more complex nature.

The hands moving in space are capable of representing events that simultaneously involve a predicate and its arguments – like giving something to someone, or skimming across a bumpy surface in a car, for example -- with a form that is correspondingly simultaneous. The result is verb agreement (exemplified in **Figure 6)** and classifier constructions (exemplified in **Figure 7)**, resp. Therefore, these structures, with particular grammatical properties, are found in all established sign languages that have been studied, leading to the observation that sign languages belong to a single morphological type (Aronoff, Meir, and Sandler, in press). While the grammatical details of this morphology differ from sign language to sign language, the principles upon which they

are based are the same, and this similarity makes another welcome contribution at the dinner table.

The role of language age

Recent work pinpoints the role of language age in the structure of sign language, indicating how age may be partly responsible for the impression that cross sign language differences are less abundant than is the case across spoken languages. It does so by comparing the type of morphology ubiquitously present in sign languages with a language-specific type (Aronoff, Meir and Sandler, in press). This study points out that the form taken by the verb agreement and classifier systems in all established sign languages is similar (though not identical), due to the modality pressures of iconicity and simultaneity sketched above, but that sequential affixes of the kind exemplified in **Figure 4** vary widely between the sign languages studied. Such affixes, arbitrary rather than iconic in form and limited in number, develop through grammaticalization processes, and these processes take time. Given time, more such arbitrary, sign language-specific processes are predicted to develop.

The physical channel of transmission affects language in both modalities. Where sign languages are more simultaneously structured, spoken languages are more linear. Where spoken languages are mostly arbitrary, sign languages have a good deal of iconicity. However, none of these qualities are exclusive to one modality; it is only a matter of degree.

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