Putting the Pieces Together:
Commentary on "The Onset and Mastery of Spatial Language in Children Acquiring
British Sign Language" by G. Morgan, R. Herman, I. Barriere, and B. Woll.

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In recent decades there has been an outpouring of research into spoken and signed languages all over the planet. This research makes it evident that regardless of diversity of form, and regardless of expression in the vocal or manual modality, all human languages demonstrate common construction principles.

Signed languages, more precisely described, make use of hands, face, and body to encode meaning. Contrary to widespread belief, such languages are not pantomimic and are not the same everywhere. Just as separate hearing communities have separate spoken languages, so do separate Deaf communities have separate signed languages. And just as both voice and body allow for depiction of various situations, neither is rich enough in iconic resources for the full range of contents that human beings want to communicate. Thus, every community, over time, has established conventions for making reference and producing propositional utterances that assert, deny, question, command, doubt, qualify, and so on. A longstanding community language like BSL or ASL is capable of expressing everything that can be expressed in English by the surrounding hearing communities of Britain and North America.

In order to learn a language, the child has to acquire a set of conventional forms and a set of patterns for combining those forms. And, in order for assemblages of forms to have communicative value, there must be stable and consensual mappings between such constructions and situations in shared worlds. Therefore, the child cannot long persist in its own vocal/gestural communicative productions.

At issue in the excellent article by Morgan, Herman, Barriere, and Woll is the early development of BSL, as it emerges from natural gesture and is shaped by exposure to the signing of competent Deaf adults. One might have thought that the iconic potentialities of a language grounded in gesture would give the learner some advantage. But what precisely could such an advantage be? We have long known—since at least Piaget (1946) and Werner and Kaplan (1963) early in the last century—that meaningful (often called "natural") gestures are created by children on the verge of language acquisition. And the work of Susan Goldin-Meadow and her associates (Goldin-Meadow et al., 1995) has shown that deaf children deprived of input from signing adults nevertheless create systematic communication patterns based on gesture. So it is to be expected that deaf babies with signing parents will also gesture meaningfully, as indeed they do. But natural gesture cannot get the learner very far into the acquisition of any particular sign language.

Consider the parts of language that have to be learned. There are, of course, the lexical items (not dealt with in the paper by Morgan et al.). Some of these are iconic—that is, some of them are depictive or enactive—but not in any predictable fashion. For example, a tree is lexicalized in ASL by a vertical forearm with spread fingers and a slight wrist vibration, suggesting a trunk and branches, whereas in the Sign Language of the Netherlands (SLN) the semantically comparable form consists of both raised arms, with vertically-extended index fingers, a brief descending zigzag motion suggesting leaves and branches, followed by a straight, parallel downward movement, tracing a trunk. These forms are, at the same time, iconic and conventional, just like the English "cock-a-doodle-doo" and the Spanish "qui-qui-ri-quí." However, in both signed and spoken languages, the bulk of the lexicon is not transparent.

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Consider, for example, either the English word "apple" or the ASL sign for apple that is formed by a right-handed fist with the knuckle of the index finger extended, placed near the right side of the mouth, with a reduplicated downward twist of the wrist.

Morgan et al. are concerned, essentially, with verbs of motion and location. In languages like BSL, ASL, and many others, such verbs include handshapes that serve as incorporated pronouns or referential place-holders for entities that have already been established in discourse. As shown in Figures 1 and 2 of their article, the verb consists of a handshape that moves along a path or is set down at a location. These handshapes, referred to as "classifiers," make reference in strictly conventionalized ways, picking out relevant abstract dimensions of entities: long thin, bulky, flat extended, etc. Additionally, some types of entities are indicated by fixed forms, such as the BSL flat hand for vehicles and the thumb-pinkie configuration for airplanes. Other sorts of classifiers, not dealt with by Morgan et al., are enactive; for example, a sheet of paper can be depicted by a flat handshape if its location is predicated, but by a thumb-forefinger pincer movement if its transfer by hand is predicated. Furthermore, a moving or located figure can be predicated with reference to a ground, such as putting an object (figure) on a table (ground). The moving figure is indicated by the dominant hand, and the ground by the nondominant hand, also using a classifier handshape, such as a flat hand to indicate a surface such as a table. Note that the referential elements incorporated in verbs are abstract and general: the flat hand can indicate a vehicle, a table, a sheet of paper, and so forth, as the situation demands. Thus the verb shown in Figure 2 simply means something like 'vehicle moves under arched plane'. This is a quite different type of language than the spoken/written English of the surrounding community.

Note that several different sorts of issues relevant to iconicity are at play:

- Does the handshape refer to the size and shape of the referent or to the way in which the referent is handled?
- Does the handshape refer to a moving/located figure or to the ground in relation to which the figure moves or is located?
- Are the handshapes for figure and ground appropriately co-located?
- Does the movement of the hand indicate the path traversed by the figure and/or the manner in which the figure moves?

Each of these dimensions has a developmental history in sign language acquisition, and each of them is amenable to iconic expression—to some extent. At best, iconicity can start the child off—at least in those instances in which a natural gesture bears some similarity to a conventional form. For example, a very young child may refer to a floating balloon by cupping two hands, palms facing, drifting back and forth together. This gesture is close to conventional means of representing the referent and its motion, and the spontaneous use of roughly representational handshapes and movements may be a sort of gestural bootstrap into sign language (Hoiting & Slobin, 2007). But, beyond this start, the child must acquire the specific handshapes and movement patterns of the language, and—importantly—must learn to limit those movements to a small three-dimensional "box" of space in front of the chest, roughly from shoulders to waist. As Morgan et al. critically point out, "sign languages use language conventions to map out even basic motion and location situations and these are significantly different from the ways that hearing people use gesture" [ms p. 7, penultimate paragraph of section 3].

What is especially difficult to master—as nicely demonstrated by Morgan et al.—is the integration of a number of different referential dimensions in one signed utterance. The handshapes for figure and ground must be contextually correct and conventionally appropriate;

the ground must be indicated as well as the figure, with appropriate timing; the orientations of both figure and ground must be referentially appropriate; the movement must be within signing space and performed with conventional trajectory, rate, and rhythm; and co-occurring features such as path and manner/rate/intensity must be articulated simultaneously. These are essentially combinatorial challenges, and iconicity cannot help here. For example, the authors cite an example from Newport and Meier (1985) in which a child is describing a film clip of a bird flying upward. The child separately signs an arc and an upward path, rather than combining them into one sign. Similarly, a child learning English may easily describe a ball rolling out from under a table as "under" or "out," only later mastering combinations such as "out from under." In the acquisition of either a signed or spoken language, the greatest challenges lie in the integration of elements into larger structured wholes.

In addition, on the level of content, mastery of form is paced by mastery of the underlying conceptual dimensions. This truism, long ago presented by Piaget, is again reinforced in the findings of Morgan et al., where the order of development of spatial notions, from topological to projective to Euclidean, matches the Piagetian framework and the findings from investigations of the acquisition of various spoken languages.

Morgan et al. have done a great service in making these issues of sign language acquisition clear to an audience concerned with cognitive development. The Mark corpus is one of the most detailed and thorough documentations of the early acquisition of any signed language, and this article shows the rewards to come in careful mining of these unique data. The comprehension experiment provides a quick overview of the many complex and interesting aspects of sign language that are responsible for the extended course of acquisition through childhood. More detailed studies of this type will indicate the extent to which the course of language acquisition is common across modalities and language types—such as issues of integration of elements mentioned earlier—as opposed to special issues posed by modality and/or language type. Because BSL differs from English in both modality (sign versus speech) and type (on a number of linguistic parameters), much more work will be needed on the description and developmental study of a range of signed and spoken languages. The current study is a valuable landmark along the way.

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