# Emerging Sign Languages

Irit Meir

Department of Hebrew Language

And Department of Communication Disorders

The University of Haifa

31905 Haifa, Israel


Wendy Sandler

Department of English Language and Literature

The University of Haifa

31905 Haifa, Israel


Carol Padden

Department of Communication

University of California, San Diego

La Jolla, CA 92093-0503


Mark Aronoff

Department of Linguistics

SUNY Stony Brook

Stony Brook, NY 11794-4376



Corresponding author: Irit Meir

imeir@univ.haifa.ac.il

# Emerging Sign Languages

Irit Meir, Wendy Sandler, Carol Padden and Mark Aronoff

<1>Introduction

Herodotus tells the story of the Egyptian king Psammetichos's effort to answer the question, Who were the first people in the world?  He placed newborn twins in the custody of a shepherd on an uninhabited island, with instructions not to speak to them. After two years, he returned to learn that the children's first recognizable word was 'bekos,' the Phrygian word for bread, and so concluded that the Phrygians were the first.

The tale of Psammetichos has long been one of the best remembered of Herodotus's stories because it strikes a nerve.  Language is the most human of all behaviors and it is natural to want to know how it all started. But we cannot go back in time and there is little if any evidence in the fossil record that can tell us about the origin of language.  Although this lack of hard evidence has not prevented scholars especially in the last decade, from speculating about the evolution of language (see e.g., the papers in Knight, Studdert-Kennedy, & Hurford, 2000; Tallerman, 2005; Wray, 2002), others have turned their attention to more concrete pursuits attempting to study how new languages are born, on the assumption that new languages will shed some light on what the first languages were like and under what conditions they were able to develop and thrive.

Modern students of language are just as eager to discover the 'first' language of humans as Psammetichos was, but for somewhat different reasons.  Underlying the contemporary interest in new languages are three main theoretical questions:  First, we would like to know what the most basic ingredients of any language must be in order for

it to function fully as a language.  What does a new language look like?  This is the quest

for the fundamental elements of language. Second is the question of how these basic

ingredients of language emerge in a community of humans without a linguistic model,

and how long it takes for this to transpire.  Is the ability to construct a language so hard-

wired that language will arise full-blown in all its complexity in a single generation?  Or

do interaction and experience over time play a crucial role in the emergence and

development of language as we know it?  We may think of this as a question about the

contributions of nature and nurture in language birth and development.  Last is the

question of the relation between language and the characteristics of its community.  Do

the size and composition of the community make a difference in the scope and structure

of the language it creates?  Do patterns of interaction within the community influence the

course of development of a language?

The only known spoken languages that are new are pidgin and creole languages.

Pidgins come into being when speakers of two or more mutually unintelligible languages

need to communicate with one another. Once such languages become the native language

of children born into a pidgin-speaking household, they are referred to as creoles. Some

scholars argue that these languages can reveal much about what is essential to any

language, because they are new (McWhorter, 1998). However, pidgins and creoles are

rooted in two or more existing spoken languages, and therefore are never free of

influence from their source languages.  For this reason, they are not entirely new.

Recently, linguists have realized that there is one type of language that can arise

in the manner of Psammetichos's experiment. There are circumstances under which a

small group of people can form a language apparently out of nothing.  We are referring to

new sign languages, which are created when deaf people without any prior exposure to either signed or spoken language find themselves together and form a communicative community. Through careful investigation of these languages, we hope to discover some possible answers to the three basic questions we have raised.

The new sign languages that linguists have begun to study fall into two categories, distinguished by the social conditions of their formation (Sandler, 2005; Woll & Ladd, 2003), which we will call *village sign languages* and *deaf community sign languages*. The major difference between the two is in the social homogeneity of their origins. A village sign language arises in an existing, relatively insular community into which a number of deaf children are born. A deaf community sign language, on the other hand, arises when a group of deaf individuals, often from different places, are brought together (frequently for educational purposes, as in a residential school) and form a community.

Categorizing new sign languages in this way allows us to consider potentially important differences arising from the two types of linguistic environments. In the village sign language setting, people share a common culture and social environment at a very intimate level from the beginning. Their shared context, expectations, and knowledge make it easier for them to communicate than it is for people with diverse backgrounds. This degree of familiarity may allow them to be less explicit verbally than people who do not have as much in common, yet at the same time to communicate effectively across a range of topics provided the context is shared. The broad diversity that characterizes the users of new sign languages of the other type, the deaf community sign languages, may have the effect of increasing the speed at which systematic linguistic structures develop. These are intriguing possibilities, for which some evidence already

exists. By discovering and investigating new languages in each of these two categories, linguists are gaining new insight into the three fundamental theoretical issues raised above.

In what follows, we assume a distinction between gesture, homesign, and sign language, and focus exclusively on sign languages. Gesture and sign language are distinguished primarily by conventionalization and systematicity. *Homesign* is a basic communication system created within a family with one or few deaf members. The obvious difference between such a system, which may be conventionalized for the solitary child who creates it, and sign language is the number of people for whom manual-visual language is primary. In homesign, it is one, while in either a village or a deaf community sign language it is many, and this difference leads to structural differences in the two kinds of language. However, the distinction is not categorical but gradient. Homesign systems can emerge in a family with more than one deaf child. In such cases, the community numbers several individuals. Whether the emerging communication system looks more like a homesign created by one individual or a sign language is an empirical question that should be studied for each case. In addition, different sign languages can exhibit different degrees of conventionalization, as we describe below. Readers are referred to McNeill (1992) for criteria that distinguish sign language from co-speech gesture, and to Singleton, Morford, and Goldin-Meadow (1993) for an interesting discussion of gesture, homesign, and sign language form.

<1>Village sign languages: social characteristics and examples

*Village sign languages* develop within small communities or villages with a high incidence of hereditary deafness. The percentage of deaf people in the community may reach as high as 3.5%, more than 40 times the usual incidence elsewhere.[i] Village sign language communities are typically socially separated by reason of ethnicity or geography. The deaf people born into such communities may not attend school (as do hearing people in the same communities), in which case they do not have access to the national deaf educational system or to the major deaf community, if there is one. Therefore, these deaf individuals are not exposed to any existing sign language in the region. In such contexts, the birth of even a small group of deaf children in the community may give rise to a sign language that develops without contact with other sign languages. These languages emerge from the need to communicate within families, and they are characteristically used by both deaf and hearing members of the community.

The creation of such a system is vividly described by a hearing son of a first generation deaf person from the Al-Sayyid village, who explained to us how the Al-Sayyid Bedouin Sign Language (ABSL) arose: "The parents needed to communicate with the deaf children born into the family. They wanted to transmit information about everyday activities and interactions, as well as values and traditions important for the community. They used whatever communication system worked. Since the children were deaf, they used gestures. Some of the gestures were already being used in the community, others were invented by the children and still others by their parents."

Since the language is used by both deaf and hearing members of the community, initially there is not a deaf community per se, but rather a signing community, which is actually much larger than the number of deaf people in the community. The transmission

of the language is within and between families, and both deaf and hearing members play a role as linguistic models and as acquirers. In village sign languages, many children, both hearing and deaf, acquire the language from birth, or very early in life.

Using archival records and interviews with the oldest residents of Martha's Vineyard, an island off the coast of Massachusetts, Groce (1985) traced the history of a community that had used a sign language for communication among its hearing and deaf residents for several generations. At one time, the percentage of deaf people in the island was high, especially in two villages, Tisbury (2%) and Chilmark (4%). Even within these villages, deafness was not evenly spread. Groce points out that in one particular neighborhood of Chilmark with about 60 people, the rate of deafness was 25% (1985, p.42). Use of the sign language was frequently noted in written records of the island through the latter half of the nineteenth century when the collapse of the whaling industry on the island forced many to relocate to the mainland, and the language was lost in favor of American Sign Language (ASL).

Unlike the situation in Martha's Vineyard, where the number of deaf people in particular villages was very high, the number of deaf people on Providence Island in the Western Caribbean was very small and widely distributed (Washabaugh, 1986). According to Washabaugh's investigation, deafness in the island could be traced back at least three generations. Washabaugh identified twenty deaf individuals out of a population of about 3,000 in the island, distributed in five or six villages. In addition, people from different villages did not interact with each other on a daily basis because of geographic separation and social stratification. For these reasons, many of the interactions of deaf people on the island were with hearing people in their own village.

A similar situation was described by Osugi, Supalla and Webb (1999) for Amami Island in Japan. Though there is a high percentage of deaf people on the island (between 0.27% and 1.4% of the population, deaf people in one village had little contact with deaf people on the other side of the island because of the difficulty of navigating across the island's mountainous terrain. When Osugi et al. elicited a basic vocabulary list from the Amami signers, they found consistent use of vocabulary among members of the same family in one village which differed from those used by deaf people elsewhere on the island.

In recent years, several detailed studies of other village sign languages have appeared. In Israel, a sign language emerged and developed in a small relatively insular and endogamous Bedouin community with a high incidence of nonsyndromic recessive deafness (Scott et al., 1995). The Al-Sayyid founding family settled in present-day southern Israel about 200 years ago, and after five generations (about 75 years ago), four deaf siblings were born to one family. In the next two generations, deafness appeared in a number of other families resulting in what today is estimated at about 130 deaf adults, teenagers and children, in a community of about 3,500 members (or 3.7%). The sign language that arose in the village, Al-Sayyid Bedouin Sign Language (ABSL), is different in word order from Israeli Sign Language (ISL), and from the surrounding spoken languages, the local Arabic dialect and Hebrew (Sandler et al., 2005). It differs in vocabulary from the other sign languages of the region, Israeli, Palestinian and Jordanian sign languages (Al-Fityani, 2007).

Vocabulary comparison is considered a strong measure for establishing possible genealogical relationships between languages. Since the vocabulary of ABSL differs

significantly from other sign languages, a very plausible conclusion is that ABSL developed independently, and not modeled after an already existing sign language. The language 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. Deaf people are fully integrated in the social life of the village: they are married into different families, and their social interactions are no different from those of hearing people. The common 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.

Another village sign language that has been under recent study is Kata Kolok, literally 'deaf language', that developed in Bengkala, an Indonesian village located on the north shore of Bali (Marsaja, 2008; Winata et al., 1995). In the village, often referred to as Desa Kolok, literally 'deaf village,' there are 47 deaf people (out of a population of 2,186), distributed through the major clans in the village. Although the deaf people themselves constitute 2.59% of the village's population, the percentage of hearing people with deaf family members is 4.29%, and most of the people in the village are in close daily contact with deaf people. Marsaja (2008, p. 99) reports that about two thirds of the people sign to some degree, and about 500 people are fluent signers. Therefore, the entire signing community is about 1,200 people.  The deaf people in the village are fully integrated into the secular and religious activities of the community, and have some special roles, such as burying the dead. According to Marsaja (2008, p. 70), the people of the village believe that deaf people are on better terms with both deaf and hearing gods and spirits, and are therefore more suited to this task.

Nonaka (2007) reported on a sign language that emerged in Ban Khor, a small rice-farming community consisting of a few neighboring villages in northeastern Thailand. The number of deaf people in this community is about 17 out of 2,700 (0.65%), and deafness is known to have existed for at least three generations, making the sign language about 60-80 years old.

Nyst (2007) studied the sign language that emerged in Adamorobe, an Akan village in the Eastern region of Ghana. The incidence of hereditary deafness is about 2.5% (35 people in a village of 1,400 inhabitants), and it may have been higher in the past. The village is thought to be 200 years old, with deaf inhabitants present from the beginning (see Nyst, 2007). Deaf people seem fully integrated, but deaf-deaf marriages were banned in the past, and currently are tolerated but not favored. Most deaf men do not marry, while deaf women may become second wives in this polygamous community.

A different type of social setting for a village sign language has been discovered among Algerian Jews originating from Ghardaia, a mostly Berber town located in the M'zab (sub-Saharan) region of Algeria. The Jewish community of Ghardaia goes back 700-800 years. Inhabiting a walled-in neighborhood within the town, the Jewish community was socially and genetically isolated. Consanguineous marriage was very common in the community, and it resulted in a high percentage of deafness (2.5% according to Briggs & Guede, 1964). As with the other communities described above, a sign language developed, used by both deaf and hearing individuals. By the 1960s, the entire Jewish community had left Ghardaia, and its members emigrated to Israel or to France. Families with deaf members continued to use their sign language in their new countries, but it was kept as a private family language. Most users of this sign language in

Israel today are bilingual in Israeli Sign Language and Ghardaia Sign Language, and the

language is hardly used by the younger generation, who have adapted entirely to using

ISL.

<1>Deaf community sign languages: social characteristics

The second type of new sign language, the *deaf community sign language*, arises

when unrelated signers of different backgrounds come together in one place. Typically

the establishment of a school for deaf children draws together deaf people from within a

larger region to one location, but other institutions such as deaf associations and clubs can

also provide a meeting place for communication among signers. In such cases, language

learning takes place in large measure between peers and unrelated adults. The history of

major European sign languages and those of North America is directly linked to the

building of deaf schools in the eighteenth and nineteenth century, and the clubs that

formed in communities around them (Woll, Sutton-Spence, & Elton, 2001).

In situations like these, the deaf people typically have varied language

backgrounds. Some may have already learned an existing sign language. Others may

have grown up using sign communication only within the family, that is, homesign

(Goldin-Meadow, 2003). This mix of linguistic systems can be compared to that found in

the initial stages of pidgin formation. However, unlike spoken pidgins, in the signing

situation some people may come with little or no prior exposure to any language. In some

rare cases, none of the members of the new language community know an existing sign

language beyond their home signs, and the sign language that emerges can be regarded as

new.

The linguistic origins of most established and well studied deaf community sign languages are not well documented. We can assume that they arose under the conditions of linguistic interaction just described, yet details about the languages and sign systems that gave rise to modern day sign languages are sparse. For example, it is well known that French Sign Language played an instrumental role in the development of American Sign Language (ASL) in the first school for deaf children founded in 1817 in Hartford, Connecticut. Woodward (1978) compared the lexicons of ASL and French Sign Language (LSF) and found that between 50-60% of the two languages' vocabularies were identical or similar, showing that the two languages were related, as expected. But the fact that there remained a large number of unrelated vocabulary items suggested that ASL must have had other lexical or structural contributions during its history. Based on the evidence of ASL's lexicon, Woodward argued that other sign languages in America dating from before the arrival of LSF in Hartford must have played a role in the emergence of ASL. Woodward's claim has been further supported by recent historical descriptions of deaf individuals and sign language communities in colonial New England and Canada before the beginning of the nineteenth century (Carbin & Smith, 1996; Lane, Pillard, & French, 2000). From these records, we learn that deaf individuals were not confined to their families, but traveled frequently within the region, and some married each other and formed communities as in the case of a signing community in Maine and another in New Hampshire. There must have been homesigners in addition to village sign languages like that of Martha's Vineyard, yet we have no documentation of these different systems or how they contributed to the development of ASL.

Fortunately, there are new deaf community sign languages of which the very early stages are now being documented, enabling us to study the course of their development in more detail. A key characteristic of new deaf community sign languages, as opposed to village sign languages, is that most of the signers are unrelated to one another, and may come from different regions or cultural backgrounds. Also, the community of the emerging language consists largely of deaf people, who come together because of their common experience of deafness, and continue to stay together in the presence of institutions like deaf schools, clubs and associations. In other words, these are deaf communities as well as signing communities; the language emerges simultaneously with the community.

<2>Two new deaf community sign languages

Nicaraguan Sign Language is a modern-day example of an emerging deaf community sign language ( Kegl, Senghas & Coppola, 1999; Senghas 1995). The first deaf school in Nicaragua was opened in Managua in 1977. Deaf children who had previously lived with their hearing families in remote parts of the countryside were brought into the city to attend school. Within two decades, a new common sign language was formed through the intermingling of different sign systems: the home sign systems of individual deaf children, a few cases of deaf siblings sharing a sign language within a family (similar to the Amami case described by Osugi et al., 1999), and possibly, contributions from users of established sign languages in Europe and North America who visited the school.

Israeli Sign language (ISL) is another new deaf community sign language. It evolved along with the Israeli deaf community beginning about 75 years ago, in a pidgin-like situation (Meir & Sandler, 2008). Deaf Israelis 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 went to the school for the deaf in Jerusalem that was founded in 1932, but the majority of deaf people who would form the clubs and attend the new schools were immigrants, first from Europe (Germany, Austria, France, Hungary, Poland), and later on from North Africa and the Middle East (Morocco, Iraq, Iran, Algeria, Egypt). 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. Today, four generations of signers exist simultaneously within the deaf community, which numbers about 10,000 members.  It includes people from the very first generation, who contributed to the earliest stages of the formation and development of the language, to the present generation, now the fourth, that has acquired and further developed the modern language as a full linguistic system. ISL, then, is an example of a deaf community sign language that is not entirely new in the Psammetichos sense of "original," since some of its first generation signers had been exposed to other sign languages before becoming a part of the emerging ISL community. What is special about ISL is its recent origins, making the signing of the first generation still available to us today ( Meir, in press; Padden et al.(b), in press;), unlike older deaf community languages such as ASL. Since ISL is more or less the same age as ABSL, a village sign language, a comparison between new languages resulting from the two different social settings is made possible.

<1> Variables in emerging sign languages

Emerging sign languages are young by definition, the social conditions and histories of their communities are often traceable, and their linguistic development is sometimes observable from a very early point. As we have noted, emerging sign languages develop under two distinct settings: inside small communities or villages where transmission is within and between families, and under circumstances where unrelated signers of different backgrounds are brought together in locations such as clubs or schools. Yet within each type languages may differ from one another in various respects. It is precisely this variation within types that makes them so valuable to linguists and sociolinguists. Since all of these languages offer natural situations in which access to social and linguistic factors are restricted in terms of either size of community, exposure to a full language, or exposure to language from a very young age (Senghas, 2005), they provide natural laboratories in which we may examine and pin down with some precision the relative contribution of different factors to the linguistic system that emerges. By isolating these variables and comparing linguistic systems, we may learn more about the contribution of each variable to the emergence and development of language. We describe here several dimensions along which emerging languages may vary, starting with variation in the social structure of the communities, and then turn to linguistic properties of the languages themselves.

<2> Characteristics of sign language communities

      a. **Size of community**: In general, deaf community sign languages have much larger communities than those of village sign languages. Because of their institution-

based origin, new members enter the community regularly and remain together over an extended period of time. In Nicaragua, 15-20 deaf children enroll in the school in Managua every year (Senghas, 2005). In 1997, the community numbered three thousand according to official figures. In Israel, the establishment of the deaf association in 1944 drew deaf people from around the country including new immigrants. The deaf community grew in about six decades from a few dozen to about ten thousand members . Deaf community sign languages often become national sign languages. ASL, which originated in the first American school for the deaf, quickly spread across North America and into Canada, where it is now the primary language of about a quarter of a million people.

Village sign languages, on the other hand, depend solely on human reproduction and genetic transmission of deafness. The number of deaf people born into the community may be very small. For example, Ferreira-Brito (1984) reports five deaf people in the Urubu-Kaapor tribe in Brazil; Ban Khor has 17 deaf people[ii], and Adamorobe 35 deaf individuals. Desa Kolok in Bali has 47 deaf people. The largest deaf population in a village community reported so far is that of the Al-Sayyid village (about 130 deaf members). However, the size of the signing community in the village setting depends not only on the number of deaf people, but also on the involvement of hearing villagers in sign communication. In Desa Kolok, almost two thirds of the village's over two thousand inhabitants sign to some degree. Ferreira-Brito (1984) reports on a Brazillian village with only one deaf child, but where all the hearing people in the village communicate with that child in signs. Here, the signing community can be said to consist of the entire village, although the signing is the primary language for only one person.

Kuschel (1973) describes a similar case. This situation contrasts with the homesign situation in some families, where the entire language community consists of a single person because other family members do not adopt the gestural system invented by the deaf child, or do so very minimally (Goldin-Meadow, 2003). The total village signing community, then, may be much larger than the number of deaf people in the village, but typically villages grow more slowly than do urban deaf communities.

Senghas (2005) suggests that the difference in community size and growth rate may have repercussions for language change. She argues that the regular influx of new signers into the NSL community led to more rapid change in that language compared to what might be observed in a village sign language. Washabaugh claims that the limited direct interaction among deaf signers on Providence Island is one factor that accounts for the simplicity of the structure of the language. For spoken languages, Hay and Bauer (2007) have shown that languages with larger populations tend to have a larger phonemic inventory than those with smaller populations. With respect to sign languages, we do not yet know of such a direct community size effect for any aspect of their structure.

b. **Age of language**: Some of the languages under discussion are very young. Of the village languages, ABSL is about 75 years old, and the language is currently in its third generation. Other languages may be much older. Adamorobe Sign Language is estimated to be about two hundred years old. In some cases it is very difficult to determine the age of the language, since there are no written or reliable oral records about the time of the appearance of deafness in the community. Kata Kolok, the sign language of Desa Kolok in Bali, is estimated to be as much as five hundred years old according to oral history and local myths. However, geneticists who studied the distribution of the

genetic mutation for deafness in the village suggest that the language is much younger.

According to their measures, deafness first appeared in the community between 63 and

134 years ago (Winata et al., 1995, p. 342). If this estimate is correct, then Kata Kolok

cannot be much older than ABSL. The large discrepancy between the two estimates, a

difference of about 400 years, shows that caution must be exercised when clear-cut

evidence is lacking. The two new deaf community sign languages that we have described

(ISL and NSL) are also quite young.  ISL was born about the same time as ABSL (in the

1930s) and NSL is the youngest of any of the emerging sign languages documented so

far, dating from the founding of the Managua deaf school in 1977.

 c. **Distribution of deaf people in the community**: As pointed out above, the two

language types differ with respect to the composition of the signing community. In deaf

community sign languages, many of the signers are deaf. The largest fraction of hearing

signers in these communities consists of hearing children of deaf parents. Others include

interpreters, teachers, and relatives. Hearing spouses may also be part of the community,

but in the large majority of cases deaf marry deaf. Marriage between deaf and hearing is

generally the exception.

Village sign languages are more varied in terms of the distribution of deaf and

hearing members of the signing community. Usually the number of deaf people is much

smaller than that of hearing signers, but the distribution of deaf people differs across

communities. Deafness may be restricted to one or two families within the community, as

in the case of Amami Sign Language (Osugi et al., 1999) or it may be distributed widely

across the community. In the former case, a few families have many deaf members; in the

latter, many families have a few deaf members, so that many hearing people have contact

with deaf people. Lane et al. (2000) suggest that this difference in distribution might be the result of different types of genetic transmission. If the gene for deafness is dominant, deafness runs in immediate families, and there are likely to be deaf children in every generation. The majority of deaf children will have a deaf parent, and most deaf parents have deaf children. Therefore, fewer hearing people are part of the signing community, and fewer hearing people acquire the sign language as a native language. In recessive transmission, on the other hand, deaf children do not usually have deaf parents, but rather other deaf relatives. Deafness usually results from marriage among relatives, hence deaf people are part of an extended family that includes many hearing members as well. More hearing people are likely to sign, since so many of them have deaf relatives, and many hearing members are native signers. Also, many more mixed marriages between hearing and deaf occur. Most of the village communities reported in the literature show the pattern of recessive transmission, which results in deafness spreading across many families in the community. The distribution of deafness in the community affects the involvement of hearing people in the signing community and vice versa. If many families have deaf members, then more hearing people use the language on a daily basis. The result is a larger and more stable signing community. In Desa Kolok, for example, Marsaja (2008) reports that more than two thirds of the community uses the sign language, though deaf people constitute only 2% of the population. In Adamorobe, with 35 deaf people, about 300 people use sign language.

Nonaka (2007) argues that cultural practices may play a larger role than type of genetic deafness in shaping interaction between deaf and hearing signers. In Ban Khor, most deaf people are descendants of a family where the condition of deafness is

dominant, not recessive. Despite Lane et al.'s prediction, the village sign language is well-distributed across both deaf and hearing people, in large part because of the close proximity of their houses in the village.

d. **Social status of deaf people**: The communities may vary as to the social status of deaf members. In some communities deaf people do not differ from hearing members as to their social status and rights. In Martha's Vineyard, deaf people were fully integrated in the community, held land and political offices, owned businesses and engaged in trade, so much so that the distinction between hearing and deaf was vague in the mind of the islanders (Groce, 1985, p. 51). Most deaf people married hearing spouses (65%), and took part in all social aspects of life in the community. In Desa Kolok, deaf people participate in all the social and ritual duties and obligations of the community. In other communities, deaf people are quite marginalized. Washabaugh (1981, 1986) reports that in Providence and Grand Cayman islands, hearing people had a paternalistic attitude towards deaf people, who were regarded as simple-minded and were not encouraged to socialize or work outside of the family. Washabaugh suggests that the social position and geographic distribution of deaf people and their language in the community may have restricted the structural development of the sign language. He noticed that hearing people did not share complex information with deaf people, and did not engage in extended or detailed linguistic exchanges with them. The geographic isolation of small groups of deaf people from one another on the island was another factor that discouraged the expansion of the language.

e. **Exposure to other sign languages**: Many of the communities in which village sign languages have arisen have become less isolated and closed over the years. Social

changes may lead to increased social mobility, and the development of educational institutions for the deaf increases the contact of deaf members of the village with deaf people from outside.  As a result, over the years, the deaf members of all of these communities come into contact with other sign languages, which have more signers and enjoy greater status in the country. These changes endanger the delicate social networks of the community and its sign language. Therefore, all village sign languages are fragile and they are often endangered (Nonaka, 2004).

<2>Properties of the languages

    a.  **Functions of language:** Language may be used for different communicative purposes and functions (e.g., Jakobson, 1960): for transmitting information about the world, for making other people perform certain actions, for getting information from others, for regulating social interactions. Crucially, language also has a meta-linguistic function and an artistic function: it may be used to talk about language itself, and it may be used to create art forms, such as literature and poetry. Most of the literature on emerging sign languages does not directly refer to the different uses of the language in question. Washabaugh's book (1986, pp. 66-69) is an exception. He explicitly mentions that Providence Island Sign Language (PSL) lacks metalanguage. Signers do not use the language to talk about their language. He never witnessed anyone correcting another signer for incorrect signing. Interestingly, there are also no name signs. People use descriptive signs to refer to other people, but there is lots of variation in these signs, and, crucially, the people themselves have no idea that a particular sign is used as their name. In contrast, ABSL signers use their language for a wide variety of topics, including meta-

linguistic functions. They have no problem participating in linguistic tasks that require some meta-linguistic abilities; they can make comparisons between ABSL and other sign languages, and signers often comment on and criticize other signers' language productions.  As for artistic functions, no poetry has been reported in any new sign language, but ISL is commonly used in public story-telling gatherings in recent years.

**b. Language interference from the spoken language**: Since the communities of all village sign languages documented to date consist of both deaf and hearing signers, a large percentage of the language users (all hearing signers) are bilingual in the sign language and the spoken language of the hearing community. It might be expected that this language contact would result in interference from the spoken language in the sign language. Nyst indeed reports that in Adamorobe, hearing signers may be strongly influenced by the structure of Akan, the spoken language of the village, using what she refers to as "Sign supported Akan." In addition, mouthing of spoken words as well as loan translations are very common in that language. In ABSL, on the other hand, mouthing is very rare in both hearing and deaf signers, especially in the older generation. Also, the sentence structure of hearing people using ABSL does not show more similarity to their spoken Arabic dialect than the sentence structure of deaf signers.

**c. Word order:** Some village sign languages have been reported to develop a predominant word order. ABSL developed an SOV order by its second generation (Sandler et al., 2005). This order differs from word order found in the surrounding spoken Arabic vernacular, which is SVO. Literary Arabic is VSO, and  Hebrew, also spoken in the region, is SVO. Kata Kolok adheres to SVO order when possible ambiguities may arise (e.g., when both participants in an action can be either the subject or the object, as in

*X sees Y*), but uses more flexible word order when the sentence can be disambiguated by its semantics alone (Marsaja, 2008, p. 168-169). Basic word order in the spoken languages of Indonesia is SVO (Dryer, 2005), but it is hard to determine the effect of this on the word order tendencies found in Kata Kolok. In PSL there is much variation in word order (Washabaugh, 1986, p. 60). Deaf signers in the 1986 study tended to put the verb at the end, but did not use consistent order between agents and patients. Hearing signers were more consistent: they tended to have agents before patients in 99% of their utterances. As for the position of the verb, those hearing signers that had deaf family members placed the verb in final position in 64% of their responses, while those who did not have daily contact with deaf people had verb-final order only 23% of the time, which may be interpreted as more interference from the spoken vernacular, Providence Island Creole, as creoles in general are characterized by an SVO order (Arends, Muysken, & Smith, 1995).

The two deaf community sign languages reported here exhibit a variety of word orders. Signers of the first two generations of ISL do not show preference for any specific word order. Third generation signers use SOV order more than other orders, but SVO and SVOV are also quite common (Meir, in press). The SVO order thus might reflect interference from Hebrew. NSL shows a rapid change in word order. First cohort signers used mainly NV or NNV order (that is, sentences consisting of a noun or two nouns and a verb), while second cohort signers introduced many more orders (Senghas et al., 1997).

**d. Use of space:** Sign languages may use signing space to represent real-world locations, or to encode more abstract relations such as transitivity relations. The former is often referred to as topographical use of space, and the latter, grammatical or

metaphorical use of space. A few village sign languages have been reported to employ space for topographical use, but not for metaphorical or grammatical use. In ABSL, signers point to the direction of the real-world location of houses in order to refer to a person who lives in that house. They also attach pointing signs to names of locations such as cities and countries (Aronoff et al., 2008). These pointing signs are consistent with the real-world locations of the cities and countries in relation to the Al-Sayyid village. In Kata Kolok, pointing to real world locations is very common, as is pointing to real-world locations of referents. However, Kata Kolok does not use space in an abstract or metaphorical way, or to represent transitivity or transfer relations. An interesting use of space in that language is to use pointing for times of the day by pointing to the location of the sun in the sky, which varies little from day to day in a tropical latitude. In contrast to village sign languages, the two new deaf community sign languages discussed here, ISL and NSL, eventually developed grammatical use of space, but this development was gradual. It took ISL three generations to develop a full verb agreement system (Meir, in press; Padden et al. (b), in press), and a more consistent use of space in NSL developed in signers who entered the community between 1985-1990 (referred to as 'second cohort signers' by Sengahs, 2003), but it is unknown as yet whether NSL has a full verb agreement system to date. If it turns out that only deaf community sign languages have spatial verb agreement system, it would be an interesting case where a specific linguistic structure is conditioned by the socio-linguistic characteristics of the community.

<1> The theoretical significance of emerging sign languages

As pointed out above, emerging sign languages provide natural laboratories for the study of some fundamental theoretical issues in language evolution, emergence and development. We outlined three questions in the introduction: (i) What does a new language look like? (ii) How does linguistic complexity arise in language? And (iii) What is the relation between language and the characteristics of the community? Studies of the different emerging sign languages to date provide some answers to these questions, which we turn to below. However, the study of new languages is in its infancy, and researchers use different methods and materials for discovering the nature of the language they investigate. Furthermore, they may come from different academic disciplines – linguistics, psychology, anthropology – leading them to ask different research questions. For these reasons, caution is called for in comparing emerging languages to one another, since the methodologies and research frameworks of these studies differ greatly from one another.

<2> What does a new language look like?

It might be taken for granted that all languages have words and sentences. But it is still an empirical question which units are there in the very initial stages of a language. The three youngest languages described here, ABSL, ISL and NSL, all have recognizable words (both content and function words) and larger syntactic units with internal structure, such as phrases (e.g., ABSL; Aronoff et al., 2008: WOMAN HEBRON FAT 'the fat women from Hebron,' GIRL GOOD PEASANT JERUSALEM 'a good peasant girl from Jerusalem') and sentences (e.g., ISL: WOMAN BOX TABLE PUT-ON 'The woman put the box on the table').

However, the syntactic structures found in new languages tend to be simple. In the early stages of the three languages above, there is a strong tendency for sentences to contain only one nominal. Some action concepts, such as 'fall,' 'run,' and 'smile,' require only one argument, but many require two or three arguments (e.g., 'push' (two) or 'give' (three)). In such cases, signers of the first generation of ISL, ABSL and NSL tend to break the event into two clauses, with two verb signs, each predicating of a different argument (Meir, in press; Padden et al., in press(a); Senghas et al., 1997). 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 especially strong when two animate arguments are involved. Apparently, languages take time to develop grammatical markers distinguishing between the subject and the object nominals in a clause. Without such marking, it may be hard to indicate 'who is doing what to whom'. Having only one argument in a clause eliminates the need for such marking.

Little or no inflectional morphology has been found in emerging sign languages. But one morphological process is quite prevalent: compounding. This basic grammatical strategy is available for expanding the vocabulary of languages from very early on, and they make extensive use of it. Washabaugh found that 40% of the elicited signs in PSL were compounds (compared to 11.5% in ASL). Different types of compounds were described for ABSL (Aronoff et al., 2008), ISL (Meir & Sandler, 2008) and Adamorobe Sign Language (Nyst, 2007). In addition to more ordinary compounding, both ABSL and AdaSL have a specific type of compounding, in which one member of the compound is a sign indicating the relative length and width of an object by pointing to various parts of

the hand and arm. These 'measuring stick signs', which are akin to Size and Shape

Specifiers, have not been reported in other sign languages so far. The specifiers pattern

somewhat differently in these two languages, revealing grammatical differences within

the same type of structure in different emerging sign languages.

Another important component of languages found very early on is prosody.

ABSL (Aronoff et al., 2008; Sandler et al., 2005) and ISL (Nespor & Sandler, 1999) use

systematic prosodic cues for chunking information units and connecting them to one

another.  As in more established sign languages, these cues consist of rhythmic patterns

conveyed by the hands, accompanied by facial expressions and head and body postures.

In fact, it is through studying the prosodic chunking of the emerging Al-Sayyid Bedouin

Sign Language that researchers were able to identify constituents for determining word

order patterns in otherwise unclear cases.


<2> How does linguistic complexity arise in language?

Though emerging sign languages have properties such as communicative depth

and the existence of words and sentences that characterize them as languages, they seem

to lack complex structures, suggesting that languages accrue complexity over time, and

do not arise full-blown in a single generation. For instance, there are no reports of a

village sign language with syntactic embedding, that is, the embedding of a clause inside

another, as in *'He told me **that he is coming'***, or *'The boy **that you met yesterday** is my*

*son'*.   Similarly, the complex spatial morphology that marks verb agreement in many sign

languages has not been attested in any village sign language. The mechanism of verb

agreement in sign languages involves associating discourse participants with locations in

the signing space, and moving the path of verbs denoting transfer between these locations

in a rule governed manner.   This mechanism was generally thought to be a typological

mark of sign languages, yet it is absent from village sign languages.    Aronoff et al.,

(2005) suggest that grammatical use of space in verb agreement and in a system of

classifier constructions tend to occur in all established sign languages even though they

are relatively young, due to the iconically motivated basis of these systems.  Yet the

evidence so far indicates that emerging sign languages do not have structures of this kind

from the beginning.  Village sign languages do not seem to have these spatially based

grammatical systems ( Aronoff et al., 2004 ;  Marsaja, 2008), and research on ISL and

NSL has shown that the grammatical use of space in these deaf community languages

develops gradually.

     While some types of grammatical conventionalization have been reported, not

all new sign languages share the same types of grammatical structures, showing that there

is no single path to development. For example, ISL and ABSL chose different paths when

developing grammatical devices for marking of argument structure: ABSL moved

towards relying on word order, while ISL developed verb agreement (Meir, in press).


<2> What is the relation between features of language and characteristics of the

community?

     Earlier, we described several dimensions along which emerging languages may

vary. By comparing languages of communities that differ along well-specified

dimensions, it is possible to pin down the relative contribution of these factors to the

development of the language.

One such factor is the degree of integration of deaf people in the language community. According to Washabaugh, PSL did not develop into a fully structured system, despite the fact that it is at least three generation old, because of paternalistic attitudes toward deaf people and their isolation from one another. This explanation suggests that language requires more than human individuals and time to develop into a fully structured system; varied and frequent social interactions are also a crucial factor.

Further evidence for the role of the community in language development comes from comparing the two types of emerging sign languages presented in this chapter. Deaf community sign languages appear to be more dynamic than village sign languages, perhaps because of the rapid influx of new signers into the community and the wider range of contact with one another and of information contexts that are found in institutionally-supported communities. Senghas and her colleagues (Senghas, 1995; Senghas et al., 1997) have shown rapid language development and change between cohorts of school children Nicaragua. ISL and ABSL are more or less of the same age, but they developed under very different circumstances, and show differences in grammatical development. In ISL, the rapid growth of the community resulted in quicker rate of change than in ABSL. The difference between third generation vs. first and second generation signers is larger for ISL than for ABSL with respect to the development of grammatical use of space (Meir, in press; Padden et al., in press (b)) .

One observation that recurs in accounts of village sign languages is the extent of lexical variation. A surprising degree of lexical variation is reported to be found in Adamarobe, Providence Island, Amami Island, and the Al-Sayyid Bedouin Sign languages. For example, in ABSL three lexical variants exist for commonly used words

such as *cat*, *lemon, train* and *morning*, and many signs have two variants, such as *fish, white, red, tree*, and many others. Figure 1 shows three variants of the sign *cat* in ABSL, each built on a different image: the whiskers, licking front paws, and the cat's footprints.

[Figure 1 here]

Since village sign language communities are quite small, examining the degree of variation in their languages may be more accessible than in larger language communities. Washabaugh (1986, pp. 50-51) conducted a study of lexical variation in PSL: he found that out of 63 signs that five signers signed, only two were perfectly conventionalized (having one unified form), 11 are extremely unconventionalized (five variants), and 70% of the signs have three or more variants. In comparison, the same study was run on five ASL hearing signers from four different places in the US. The results showed that ASL is much more unified: only 28.6% of the signs had more than three variants. It is possible that the iconicity afforded by languages in the visual modality facilitates the co-existence of variants within the community. Iconic signs tend to be more transparent, that is, their meaning can be deduced from their form, since their form is determined by some aspects of their meaning.   But although the auditory modality allows for a much lesser degree of iconicity, this does not mean that the variation described above did not characterize early spoken language as well, as humans are capable of storing a vast number of different lexical items, including synonyms.

In our study of the ABSL vocabulary, we have found that there is far less variation within nuclear families with several deaf members than there is across the community.   This observation underscores the centrality of the family as a sociolinguistic unit.  It is reasonable to expect that the variants will tend to converge on a

single exemplar as the overall vocabulary expands, provided there is frequent community-wide interaction.


<1> Conclusion

Roger Shattuck's book, *The Forbidden Experiment* (1980) tells the story of Victor, the Wild Boy of Aveyron, who emerged from the woods near the southern French town of Aveyron at about the age of twelve, having apparently grown up alone in the wild.  The forbidden experiment of Shattuck's title is the experiment that Psammetichos undertook, that of raising children without human company.  Its purpose is to discover human nature, what we are endowed with before culture intervenes.  But, as Aristotle so memorably put it (Nicomachean Ethics 9.9), "man is a social being, and designed by nature to live with others."  Having a culture is part of human nature. That is what sets us apart more than anything else from other creatures.  The experiment is forbidden because it is inhuman to deprive people of what is natural to them, language and culture. Emerging sign languages come closer than any other circumstance to the forbidden experiment.  By comparing the languages created under such circumstances, we can begin to learn something about the nature of language and of people. What they reveal is first and foremost that humans placed together without a cultural model to emulate (in this case, without a language) are so driven to create a community in which they can communicate with each other that  they will create their own language.

Because researchers approach their investigations with different questions, different materials, and different analytic tools, it is at present difficult to rigorously compare emerging sign languages. Nevertheless, it is fair to say that such languages all

have properties that characterize them as languages, properties such as communicative power and the existence of symbolic units -- words -- as well as sentences. They also allow their users to participate in the social life of their communities. Yet these new languages also differ from older and more established languages, both spoken and signed. And it is precisely these differences that shed light on what it takes for a language to develop, and how it does so.

Two important points arise from this survey. First, it takes more than a human brain for a language to develop. Interaction is a factor no less crucial. Home sign systems, systems created by an individual or by very few individuals, do not have the expressive capabilities and the structure of even new languages. Therefore, one brain (or two? or three?) is not enough to make a language. But even larger numbers of communicators may not guarantee that a fully-fledged language will develop. The lesson to learn from PSL, as Washabaugh (1986, p. 146) argues, is that without varied and frequent social interactions, a communication system will not develop into a complex and context-free system:

> This conclusion to the PSL research reinforces assumptions which run contrary to [those] … behind much current linguistic research… that human individuals, by reason of being endowed each with a language faculty, are autonomous and independent of one another.  But a result of this investigation of PSL is that the operation of each individual's language faculty is not autonomous but very much dependent on appropriate relationships with others.

The specific conditions under which PSL emerged and developed are essential for evaluating the contribution of social interactions to the development of language. The same is true for the other languages surveyed here

Second, new languages show that linguistic complexity takes time to develop. Languages do not suddenly materialize, complete with syntactic embedding and morphological inflection. Even a clause structure containing two animate arguments (as in '*The girl is feeding her mother*') takes some time to develop in a new language. More complex grammatical systems evolve over time, and the structures they develop will vary. The fact that syntactic embedding is not found in new languages brings into question the hypothesis that recursion, the syntactic mechanism underlying the ability to create an embedded clause, is the hallmark of human capacity for language, as Hauser, Chomsky and Fitch (2002) argue. The study of new sign languages makes it possible to raise questions such as these, and therein lies its importance for our understanding of human language. As more such languages and communities come under study, and more structured and controlled comparative studies are conducted, we will be able to refine our questions, and, we hope, to answer them.

References

Al-Fityani, K. (2007). Arab sign languages: A lexical comparison. *Technical Report.*

    *Center for Research in Language Newsletter, 19,* (1).

Arends, J, Muysken, P, & Smith, N.  (1995).  *Pidgins and creoles: An introduction*.

    Amsterdam/Philadelphia: Benjamins.

Aronoff, M., Meir, I., Padden, C. A, & Sandler, W. (2004). Morphological universals and

    the sign language type. *Yearbook of Morphology,* 19-40.

Aronoff, M., Meir, I., & Sandler, W. (2005). The paradox of sign language morphology.

    *Language, 2005, 81, 2, June, 81*(2), 301-344.

Aronoff, M., Meir, I., Padden, C. A., & Sandler, W. (2008). The roots of linguistic

    organization in a new language. *Interaction Studies: A Special Issue on Holophrasis*

    *Vs. Compositionality in the Emergence of Protolanguage., 9*(1), 131-150.

Briggs, L. C., & Guede, N. L. (1964). *No more for ever: A Saharan Jewish town*.

    Cambridge, Mass.: The Peabody Museum.

Carbin, C. F., & Smith, D. L. (1996). *Deaf heritage in Canada : A distinctive, diverse,*

    *and enduring culture.* Toronto, New York: McGraw-Hill Ryerson.

Dryer, M. S. (2005). Order of subject, object, and verb. In Haspelmath, M., M. S. Dryer,

    D. Gil & B. Comrie (eds.) *The world atlas of language structures* (pp. 330 – 334).

    Oxford: Oxford University Press.

Ferreira-Brito, L. (1984). Similarities & differences in two Brazilian sign languages. *Sign*

    *Language Studies, 42*, 45-56.

Goldin-Meadow, S. (2003). *The resilience of language: What gesture creation in deaf*

    *children can tell us about how all children learn language*. New York: Psychology

    Press.

Groce, N. E. (1985). *Everyone here spoke sign language: Hereditary deafness on*

    *martha's vineyard*. Cambridge, Mass: Harvard University Press.

Hay, J., & Bauer, L. (2007). Phoneme inventory size and population size. *Language,*

    *83*(2), 388-400.

Hauser, M. D., Chomsky, N., & Fitch, W. T. (2002). The Faculty of Language: What Is

    It, Who Has It, and How Did It Evolve? *Science*, 298,1569-1579.

Jakobson, R. (1960). Linguistics and poetics. *Style in Language,* 350-377.

Kegl, J., Senghas, A., & Coppola, M. (1999). Creation through contact: Sign language

    emergence and sign language change in nicaragua. In M. DeGraff (Ed.), *Language*

    *creation and language change: Creolization, diachrony, and development* (pp. 197-

    237). Cambrige, Mass.: MIT Press.

Kisch, S. (2000). Deaf discourse: The social construction of deafness in a Bedouin

    community. *MA Thesis, Tel-Aviv University, Israel (in Hebrew).*

Kisch, S. (2004). Negotiating deafness in a Bedoiun community. In J. V. Van Cleve

    (Ed.), *Genetics, disability and deafness* (pp. 148–173). Washington, D.C.: Gallaudet

    University Press.

Knight, C., Studdert-Kennedy, M., & Hurford, J. R. (2000). *The evolutionary emergence*

    *of language: Social function and the origins of linguistic form.* Cambridge, UK:

    Cambridge University Press.

Kuschel, R. (1973). The silent inventor: The creation of a sign language by the only deaf-

    mute on a polynesian island. *Sign Language Studies, 3*, 1-27.

Lane, H., Pillard, R. C., & French, M. (2000). Origins of the American deaf-world:

    Assimilating and differentiating societies and their relation to genetic patterning.

    *Sign Language Studies, 1*(1), 17-44.

Marazita, M. L., Ploughman, L. M., Rawlings, B., Rremington, E., Arnos, K. S., &

    Nance, W. E. (1993). Genetic epidemiological studies of early-onset deafness in the

    U. S. school-age population. *American Journal of Medical Genetics, 46*(5), 486-491.

Marsaja, I. G. (2008). *Desa kolok - A deaf village and its sign language in Bali,*

    *Indonesia*. Nijmegen: Ishara Press.

McNeill, D. (1992). *Hand and Mind*. Chicago: University of Chicago Press.

McWhorter, J. (1998). Identifying the creole prototype: Vindicating a typological class. *Language, 74*, 788-818.

Meir, I. (In press). The emergence of argument structure in two new sign languages. In M. Rappaport Hovav, E. Doron & I. Sichel (Eds.), *Syntax, lexical semantics and event structure*. Oxford: Oxford University Press.

Meir, I., & Sandler, W. (2008). *A language in space: The story of Israeli Sign Language*. New York: Lawrence Erlbaum Associates.

Nespor, M., & Sandler, W. (1999). Prosody in Israeli sign language. *Language and Speech, 1999,* 42(2-3)*,* 143-176.

Nonaka, A. M. (2004). The forgotten endangered languages: Lessons on the importance of remembering from Thailand's Ban Khor sign language. *Language in Society, 33*(5), 737-767.

Nonaka, A. M. (2007). *Emergence of an indigenous sign language and a Speech/Sign community in Ban Khor, Thailand.* Unpublished University of California, Los Angeles.

Nyst, V. (2007). *A descriptive analysis of Adamorobe Sign Language (Ghana)*. Utrecht: LOT.

Osugi, Y., Supalla, T., & Webb, R. (1999). The use of word elicitation to identify distinctive gestural systems on Amami island. *Sign Language & Linguistics, 2*(1), 87-112.

Padden, C. A., Meir, I., Sandler, W. & Aronoff, M. (In press, (a)). Against all expectations: Encoding subjects and objects in a new language. In D. Gerdts, J. Moore & M. Polinsky (Ed.), *Hypothesis A/Hypothesis B*. Cambridge, MA: MIT Press.

Padden, C. A., Meir, I., Sandler, W., & Aronoff, M. (in press, b). The grammar of space in two new sign languages. In D. Brentari (Ed.), *Sign languages: A Cambridge language survey*. Cambridge, UK: Cambridge University Press.

Sandler, W. (2005). An overview of sign language linguistics. In K. Brown (Ed.), *Encyclopedia of language and linguistics* (2nd ed., pp. 328-338). Oxford, UK: Elsevier.

Sandler, W., Meir, I., Padden, C., & Aronoff, M. (2005). The emergence of grammar: Systematic structure in a new language. *PNAS, 102*(7), 2661-2665.

Scott, D. A., Carmi, R., Elbedour, K., Duyk, G. M., Stone, E. M., & Sheffield, V. C. (1995). Nonsyndromic autosomal recessive deafness is linked to the DFNB1 locus in a large inbred Bedouin family from Israel. *American Journal of Human. Genetics, 54*(4), 965-968.

Senghas, A. (1995). Children's contribution to the birth of Nicaraguan Sign Language. Ph.D. Dissertation, Massachusetts Institute of Technology.

Senghas, A. (2003). Intergenerational influence and ontogenetic development in the emergence of spatial grammar in Nicaraguan Sign Language. *Cognitive Development* 18(4), pp. 511-531

Senghas, A. (2005). Language emergence: Clues from a new Bedouin sign. *Current Biology, 15*(12), 463-465.

Senghas, A., Coppola, M., Newport, E., & Supalla, T. (1997). Argument structure in Nicaraguan Sign Language: The emergence of grammatical devices. In E. Hughes, M. Hughes & A. Greenhill (Eds.), *The proceedings of the boston university conference on language development* (pp. 550-561). Boston: Cascadilla Press.

Singleton, J. L., Morford, J. P. & Goldin-Meadow, S. (1993). Once is not enough: Standards of well-formedness in manual communication created over three different timespans. *Language*, 69, 683-715

Tallerman, M. (2005). *Language origins: Perspectives on evolution.* Oxford: Oxford University Press.

Washabaugh, W. (1981). The deaf of Grand Cayman, British West Indies. *Sign Language Studies, 10,* 117-34.,

Washabaugh, W. (1986). *Five fingers for survival*. Ann Arbor: Karoma Publishers, Inc.

Woll, B., Sutton-Spence, R., & Elton, F. (2001). Multilingualism: The global approach to sign language. In C. Lucas (Ed.), *The sociolinguistics of sign languages.* (pp. 8-32). Cambridge, UK: Cambridge University Press.

Woll, B., & Ladd, P. (2003). Deaf communities. *Oxford Handbook of Deaf Studies, Language, and Education,* (pp. 151-162). Oxford: Oxford University Press.

Woodward, J. (1978). All in the family: Kinship lexicalization across sign languages. *Sign Language Studies, 7*(19), 121-138.

Winata, S., Arhya, I. N., Moeljopawiro, S., Hinnant, J.T., Liang, Y., Friedman, T. B. & Asher, J. H. (1995). Congenital non-syndromal autosomal recessive deafness in Bengkala, an isolated Balinese village. *Journal of Medical Genetics* (32), pp. 336-343.

Wray, A. (2002). *The transition to language*. Oxford: Oxford University Press.

Endnotes

---

[i] For example, in the United States the incidence of congenital deafness is about 0.07%

(Marazita et al., 1993).

[ii] If not otherwise mentioned, facts about the Ban Khor are from Nonaka (2007),

Adamorobe from Nyst (2007), Desa Kolok from Marsaja (2008), and Providence Island

from Washabaugh (1986).