

Laura Horton

Representational strategies in shared homesign systems from Nebaj, Guatemala

1 Introduction

Young children¹ who are deaf, and cannot hear the spoken language in their environment, and who also are not exposed to accessible linguistic input² or medical intervention, nonetheless generate productive manual systems to communicate with their hearing family and friends (Goldin-Meadow 2003, Fusellier-Souza 2006). These novel manual communication systems, sometimes referred to as homesign systems,³ are idiosyncratic to their particular individual child innovator. Despite this idiosyncrasy, they exhibit significant internal systematicity and stability. The limited distribution of standard⁴ sign languages,

1 This work was generously supported by a pre-dissertation fieldwork grant from the Tinker Foundation and the Center for Latin American Studies at the University of Chicago, NSF Doctoral Dissertation Research Improvement Grant #1627540 and NSF BCS 1227908 to Diane Brentari.

2 By “accessible linguistic input” I mean language input in a modality that is accessible to the child. For example, for a hearing child this could include any spoken or signed language, or a deaf child any sign language.

3 The communication systems developed by individual deaf children in interactions with hearing family members, friends and neighbors have been described using a variety of terms that highlight different dimensions of these systems including the number of deaf signers, the location (urban or rural) of the sign system, and the extent to which the system is used by hearing and deaf signers. Some of these terms include: homesign systems (Goldin-Meadow 2003), village sign languages (Nonaka 2009, Zeshan and de Vos 2012, Nyst 2012) communal homesign (Zeshan 2010), shared sign languages (Nyst 2012) and natural sign (Green 2014). These terms are not interchangeable and describe unique constellations of sign use in particular locations, I include them here because they are in some ways similar to the shared homesign systems I describe in this chapter.

4 In this chapter I used the term standard (Frishberg 1987) sign language to refer to sign languages that have the following characteristics: intergenerational transmission (whether within families with genetic deafness or across age-cohorts in an institutional setting), institutional support, either in a school setting or from civic organizations like deaf clubs and a substantial community of users who use the language in their daily lives. Other authors have referred to these languages as “established, deaf community sign languages” (Meir et al. 2010). In this volume, other authors use the term “institutionalized” sign languages.

coupled with the rarity of genetic deafness,⁵ would suggest that homesign systems are commonplace for many children who are born deaf around the world (Zeshan 2010).

In this chapter, I present data from homesign systems developed by deaf children and adults in the town of Nebaj, Guatemala (see sociolinguistic profile of Nebaj shared homesign systems, this volume, for more details). I use these data to expand and clarify the social circumstances, or communicative ecology, in which homesign takes part (Nonaka 2009; Hou 2016; Haugen 2001; Mühlhäusler 2003; Zeshan 2010).

The homesigners I work with are embedded in diverse communicative ecologies. They engage in highly varied communicative interactions with the hearing and deaf relatives, peers, friends and neighbors they encounter at home, at school and in public. I ask whether these diverse ecologies affect the use of referential strategies by child homesigners on a lexical elicitation task. Specifically, I consider the role of interactions with other deaf homesigners. I describe three factors that could interact with a homesigner's communicative ecology and correspond to differences in child homesign lexicons. These factors include the availability of diverse referential strategies, specifically indexical and iconic strategies; the predictable relationships between iconic strategies and referent type, described as "patterned iconicity" (Padden et al. 2013, 2015; Hwang et al. 2017); and the set of conventional gestures used by hearing people who interact with homesigners. In this study, I ask:

- Is there a correspondence between the communicative ecology in which a homesigner is embedded and patterns of referential strategies (indexical and iconic) in the lexicons of child homesigners? For example, are homesigners embedded in one type of communicative ecology more likely to use iconic referential strategies in their lexicon of signs?
- Is there evidence for patterned iconicity in child homesign systems and is there a correspondence between the communicative ecology of a homesigner and the type of iconic strategy they use?
- Does communicative ecology correspond to the use of sign forms adapted from conventional gestures produced by hearing speakers in the lexicons of child homesigners?

⁵ In a recent survey, Mitchell and Karchmer (2004) estimate that 92% of children who are deaf or hard of hearing in the United States are born to hearing parents, approximately 4% are born to one deaf or hard of hearing parent and one hearing parent and approximately 4% are born to two deaf parents.

This study is a preliminary description of the referential strategies that child homesigners mobilize in their emergent lexicons. Based on previous research on child homesign systems, I expect significant individual variation across the child homesign lexicons, but also significant internal consistency for each system, in terms of referential strategy – the relative prevalence indexical (deictic) and iconic forms.

The chapter begins with a discussion of prior work on referential strategies in young and standard sign languages, patterned iconicity in standard sign languages, and the use of conventional gestures in sign languages. In section 3, I discuss a taxonomy of shared homesign systems and how the communicative ecologies of these systems impact the social interactions in which homesigners are engaged. The fourth section introduces the participants and the fieldsite where the data for this chapter were collected and section five describes the elicitation methods and procedures used to annotate signs. The next section (6) presents the results of the study, which are discussed further in section 7, followed by a conclusion.

2 Referential strategies in young sign languages and homesign systems

This section discusses relevant existing literature on the referential strategies that will be explored in child homesign lexicons in this chapter. I begin with a review of the work on iconicity and indexical (deictic) signs in standard and young sign languages, followed by a review of work on patterns within iconicity that are common crosslinguistically. I conclude with work that has studied the relationship between co-speech gestures and forms in standard sign languages.

2.1 Iconicity and indexicality

In his second trichotomy of signs, Charles Saunders Peirce identifies three types of signs – icons, indices and symbols (Peirce 1932, 2: 247–249). In this study, I focus on two of these three types: icons and indices. This section first discusses indices, and their function in homesign systems as well as standard and young sign languages, followed by a discussion of iconic signs in homesign systems and standard sign languages.

The index is a sign vehicle that relates to its sign object⁶ through spatial and/or temporal co-occurrence, a relationship of contiguity (Deacon 1997). In visual-manual languages, as well as co-speech gestures, deictic signs or gestures – points – are an obvious example of this type of sign. The signer or speaker moves a body part to create a vector that indicates, or draws their interlocutor’s attention towards, an object, location, person or other feature of the physical context. The form of these signs may be conventional and involve internal structure that indicates features like distance and direction, in both deaf and hearing communities (see Mesh 2017 for a description of pointing conventions in a Chatino community in Mexico).

Deixis, or pointing, is also an obvious manual strategy for child homesigners to incorporate into their homesign systems. In work on a child homesigner, called David, from the United States, researchers identify two kinds of pointing gestures⁷ in David’s productions: demonstrative points and category points (Hunsicker and Goldin-Meadow 2012). They show that David combines demonstrative points with iconic characterizing gestures or category points in multigesture combinations to form nominal constituents. The data for their study was longitudinal, and David initially produced primarily single demonstrative (glossed as *that*) or nominal (e.g., an iconic or deictic sign glossed as *penny*) gestures. Over time, David produced an increasing number of multigesture combinations, and these combinations were used to refer to the same kinds of entities (people, animals, vehicles, etc.) as single gestures. Multigesture utterances also followed a predictable order and were produced at similar rates as single-gesture utterances. Pointing gestures thus form a critical, structured component of David’s homesign system, particularly early in development (data from the Hunsicker and Goldin-Meadow (2012) study were collected between ages 2;10-5;02).

⁶ Peirce (1932) uses the terminology *sign vehicle* or *representamen* to denote the sign form, and the term *sign object* to denote the entity that the sign refers to. His definition of a sign further includes the sign’s *ground* and its *interpretant*. When discussing Peirce’s work, I use the terms *sign vehicle* and *sign object*, however, for the remainder of the chapter I will use the terms “sign” and “referent” to denote the form of the sign and the concept it represents. While this collapses important distinctions, for the purposes of this chapter, these terms were sufficient.

⁷ Hunsicker and Goldin-Meadow (2012) use the term “gestures” to refer to David’s forms, so I use their terminology for his productions. I also use the term “gestures” when describing the movements hearing people make with their hands while speaking. I refer to the productions from the Guatemalan homesigner participants in this study as signs. The distinction between gestures and signs remains contested (see Green 2018 and Kusters and Sahasrabudhe 2018 for recent discussion) and I do not attempt to distinguish “gestures” from “signs” in the utterances that Guatemalan homesigner participants produced.

In addition to forming a critical component of hierarchical, structured utterances in homesign, signs that resemble co-speech pointing gestures are an integral part of the grammatical system of standard sign languages (Sandler and Lillo-Martin 2006) as well as young sign languages (Coppola and Senghas 2010). In two studies of a young sign language in Nicaragua (Coppola and Senghas 2010) and an emerging family sign language in Oaxaca, Mexico (Mesh 2017), researchers trace the path that co-speech pointing gestures take as they enter the sign languages in the community. Coppola and Senghas (2010) show that over successive age cohorts, signers of Nicaraguan Sign Language (NSL) begin to use pointing signs for more grammatical functions, such as marking subjects, functioning as pronouns and forming anaphoric constructions. In San Juan Quiahije Chatino Sign Language, Mesh (2017) identifies three components of pointing gestures – direction, elbow height and handshape – used by hearing Chatino speakers, that are conventionalized and combine to mark distinctions in distance and direction. SJQCSL signers adopt two of these features, direction and elbow height, but not handshape, in their pointing signs. The work by Coppola and Senghas (2010) and Mesh (2017) highlight the diversity of paths through which young sign languages begin to incorporate a co-speech gesture produced by hearing speakers into a sign language. Pointing in adult and child homesign has also been extensively documented (Coppola 2002; Fusellier-Souza 2006; Goldin-Meadow and Mylander 1984; Morford 1996). In this study, we evaluate how frequently child homesigners use indexical, pointing signs when they are engaged in a lexical elicitation task.

The icon is a sign vehicle that relates to its sign object through some form of resemblance (Peirce 1932; Deacon 1997). A sign vehicle that is iconic may also be conventional – an iconic legisign (Peirce 1932; Parmentier 1994) – but some aspect of the sign vehicle continues to be motivated by some aspect of the sign object, which ties the sign vehicle to a particular instantiation of that sign object. Importantly, the iconic relationship between sign vehicle and sign object only holds if it is recognized by an interpretant. Taub (2001: 19–20) highlights this fact about iconicity as well.

Iconicity is not an objective relationship between image and referent; rather, it is a relationship between our mental models of image and referent. These models are partially motivated by our embodied experiences common to all humans and partially by our experiences in particular cultures and societies.

For homesigners, iconicity is a critical tool to making themselves understood by the hearing people in their immediate social context. Lacking a shared set of conventional signs – a common language – homesigners must make their message clear to interlocutors through whatever means are most legible to their communication partners. The interlocutors that homesigners encounter will have

variable degrees of experience using their hands to communicate. If homesigners are able to iconically represent an object, an action or an event in a way that is legible to a communication partner, then it seems this might be a route towards mutual comprehension between homesigner and less-experienced, hearing interlocutor. Thus “transparent” iconicity becomes critical to the homesign system. Homesigners must identify iconic strategies that are transparent, readily identifiable and common to their predominately (or exclusively) hearing interlocutors. Additionally, Green (2014) emphasizes the significance of both interlocutors in these interactions, specifically their commitment to mutual understanding (see Green (2014), for a discussion of the ethics of interactions between deaf people and hearing people in Nepal).

The presence of iconic signs in homesign systems has been extensively documented (Goldin-Meadow 2003; Fusellier-Souza 2006). In section 6.1 we describe the frequency of indexical and iconic signs across homesign lexicons and discuss possible sources of variation in the distribution of indexical versus iconic strategies in emergent homesign lexicons.

2.2 Patterned iconicity

After an initial period in which iconicity was virtually ignored by sign language researchers,⁸ much contemporary work has been dedicated to understanding the iconic relationship between signs and their referents (Perniss, Thompson, and Vigliocco 2010; Pizzuto and Volterra 2000; Taub 2001; Occhino 2017; Occhino et al. 2017; Ortega et al. 2014). This work has demonstrated that iconicity is neither simple nor monolithic.

Recognition of the motivated, iconic relationship between a sign and its referent involves a process of image selection, conceptual mapping and schematization (Taub 2001; Emmorey 2014; Lepic and Padden 2017). This process is complex and it is not clear when and how it becomes accessible or useful for children acquiring standard sign languages (Ortega, Sümer, and Özürek 2017; Magid and Pyers 2017; Caselli and Pyers 2017; Thompson et al. 2012; Orlansky and

8 Early work on sign languages minimized their obvious iconicity as a response to claims that sign languages were not fully linguistic, but simply pantomime or mimicry (Greene 1975, cited in Lane 1992). Researchers cited arbitrariness as a defining and unique feature of linguistic systems (Saussure 1986), and as justification for “disqualifying” sign languages as natural human languages. Early sign language researchers thus sought to minimize the amount of iconicity in sign languages and its contribution to their structure.

Bonvillian 1984). In one example of the complexity of an iconic mapping between components of a sign and the components of a referent, Lepic and Padden (2017) present an analysis of the sign for TIME⁹ in contemporary American Sign Language (ASL) (reproduced from Lepic and Padden 2017: 500).

Table 1: Aspects of the modern iconic mapping for TIME (in ASL).

Form	Meaning
non-dominant hand	a human hand
back of the wrist	the location of a wristwatch
dominant hand	a human hand
crooked index finger	a human finger
contacting movement	a human finger contacting a wristwatch
repeated movement	a repeated action

In this analysis, the ASL sign iconically uses the human body to represent a human body: the signer’s hands represent human hands, the signer’s wrist represents a human wrist. The sign also depicts a prototypical activity – pointing to a wristwatch, or the typical location of a wristwatch – to inquire about the time. Despite the apparently simple, transparent iconicity of this sign, historically it originates from French Sign Language and pre-dates the invention of the wristwatch. The place of articulation for the original sign was the back of the signer’s non-dominant hand. The original sign iconically represented a mechanical component of a clock that would ring a bell to mark the time. The place of articulation was adjusted slightly in the contemporary version of the sign, to the wrist, and (re)analyzed by contemporary signers as an iconic representation of tapping the face of a watch. This historical change, as well as the slight shift in the place of articulation of the sign, illustrate the ways in which even “transparent” iconic signs may derive from older forms that were also iconic, but based on an entirely different mapping between sign form and sign meaning (Shaw and Delaporte 2010).

Diverse and complex types of iconicity are characteristic of homesign systems in addition to standard sign languages (Goldin-Meadow 2003; Fusellier-Souza 2006). In an early account of child homesigners from the United States, Goldin-Meadow and Mylander (1990) describe these iconic forms as “characterizing.”

⁹ Following sign language research conventions, I gloss signs with CAPITALS. In signs with multi-word glosses, words are separated by hyphens.

While all of the characterizing forms that they identified in child homesign systems were iconic, they varied in the transparency of this iconicity. As an example, one of the homesigners they studied produced a sign for ‘school’ in which they brought their hands together at chest height, pantomiming the act of praying. The child associated this activity with school because the school that they attended was Catholic and each day began with a prayer (Goldin-Meadow and Mylander 1990: 333). This link between this sign (pantomimed praying) and its referent (school) would only be comprehensible to an interlocutor familiar with the context of the child’s school, and is thus less transparent than signs such as the sign for eating, produced by the child, which was articulated with a fist, brought to the child’s mouth while they pantomimed the act of chewing. We could thus think of iconic signs as existing on a continuum of transparency and opacity. Green discusses a similar kind of “continuum of recognition... At one end would be conventional signs, the forms of which are not immanent in bodily or other non-linguistic routines... On the other end of the continuum would be signs that, although one had never encountered them before, could be recognized through what Hanks calls ‘the knowing body’ ” (Green 2014: 91).

This continuum of recognition intersects with another dimension of iconicity that has been observed crosslinguistically for young and standard sign languages. “Patterned iconicity” (Hwang et al. 2017; Padden et al. 2013, 2015), describes a predictable, stable relationship between certain types of referents and certain iconic strategies. In a study of eight sign languages, including both standard sign languages (American, Japanese and German Sign Languages), young sign languages (Israeli Sign Language, Al-Sayyid Bedouin Sign Language, Kenyan Sign Language and Ha Noi Sign Language) and a village sign language (Central Taurus Sign Language), Hwang et al. (2017), describe the iconic strategies that are used for three lexical semantic categories: tools, animals, and fruits and vegetables (see also Safar and Petatillo Chan, this volume, for a discussion of patterned iconicity in Yucatec Maya Sign Language). Hwang et al. (2017) find that signs for tools tend to use *manipulation*, an iconic strategy in which the signer’s body represents a human body, and the signer’s hand represents a human hand acting on the referent. For animals, all participants tended to use an iconic strategy called *personification*, in which the body of the signer represented the body of an animal and the hands represented a salient body part. Signs for fruits and vegetables typically used either a *manipulation* or *object* iconic strategy, in which the hands represented the shape of the referent. Based on the presence of these patterns across unrelated sign languages, researchers suggest a common cognitive base for sign and gesture systems, as well as bodily iconic affordances that are grounded in experience using the body both to engage in everyday activities and to communicate (Padden et al. 2013, 2015; Hwang et al. 2017).

I explore whether patterned iconicity extends to child homesign systems, as a factor that shapes emergent lexicons, in addition to communicative ecology.

2.3 Conventional gestures from hearing speakers

Sign languages researchers have suggested that sign languages may take, as their “raw materials,” the gestural repertoires of the surrounding hearing community (Newport and Supalla 2000; Pfau and Steinbach 2006; also see Le Guen et al., this volume, for YMSL). Specific examples of this process include the process of grammaticalization of a French gesture, meaning ‘to go,’ as a future marker in American Sign Language (ASL) (Janzen and Shaffer 2002). In this chapter, I consider how communicative ecology might affect the degree to which homesigners incorporate conventional gestures from the speakers in their social ecology into their homesign lexicons.

I suggest that the communicative ecology of a homesign system will affect the organization and form of the system that emerges. In this section, I have reviewed prior literature on three dimensions of signed languages – referential strategy, patterned iconicity and the inventory of conventional co-speech gestures – that might interact with communicative ecology, ultimately corresponding to predictable differences in child homesign systems. In the next section, I describe in greater detail the range and characteristics of communicative ecologies present at my fieldsite in Nebaj.

3 Communicative ecologies: Shared homesign

3.1 Shared homesign: Terminology and characteristics

Deaf people in many communities around the world differ from the individual homesigner children studied previously in the United States and other Western countries (Goldin-Meadow et al. 2009) along multiple dimensions, but in this chapter I focus on two – the role of deaf homesigner adults on child homesign systems and the role of peer homesigner children on each other’s homesign systems. These two types of transmission and interaction have been described as vertical and horizontal transmission, and have been studied extensively in Nicaraguan Sign Language (NSL), the young sign language used in Managua, Nicaragua (Senghas 2003).

Although the majority of deaf children are born into hearing families, there are communities which have a higher than average incidence of deafness in the population, due to a combination of genetic traits and consanguineous marriage (Kisch 2008, 2012). Deaf people in these communities may lack access to a standard sign language, but they do have accessible communicative input, because they can see the homesign system used by a deaf sibling, peer, parent or grandparent (similar to a small family homesign system used in Chiapas, Mexico described by Haviland, this volume). I use the term “shared homesign” for these situations and describe two varieties of shared homesign. In this conception of homesign, the term is not about the total presence or absence of any communicative or social input. Instead, the term homesign is taken to mean the absence of conventionalized linguistic input that is a spoken language or standard sign language in a modality accessible to the language learning child.

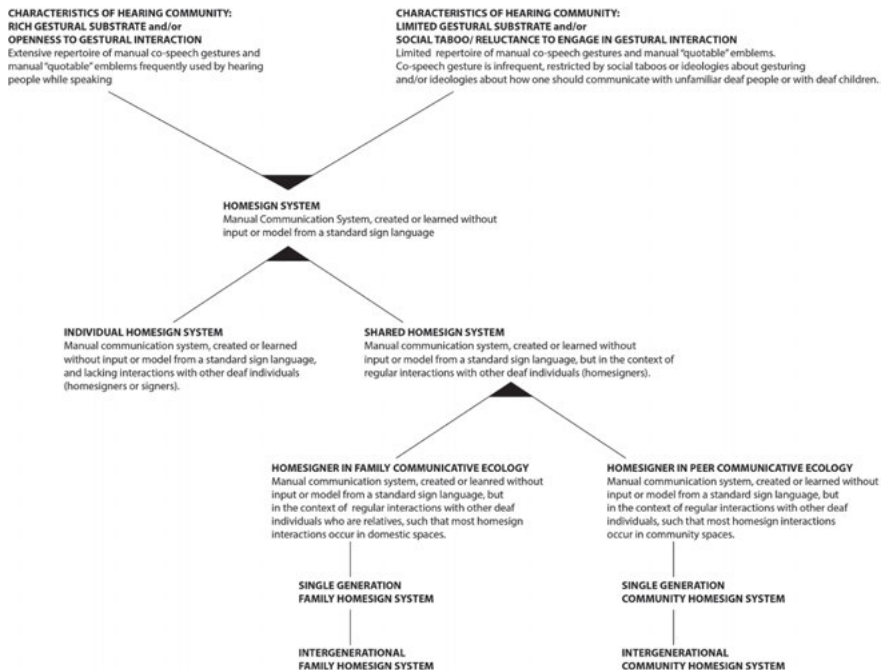


Figure 1: Shared Homesign Systems and their Gestural Context. This diagram illustrates and defines the ways in which a homesign system can exist, even when a homesigner receives some accessible input. These systems likely overlap with emerging sign languages, but they are contingent on the continued presence of deaf signers for their longevity.

3.2 Shared homesign: Transmission and interaction

Each communicative ecology varies on the following dimensions: interaction with other (deaf) homesigner peers, interaction with other (deaf) homesigner adults and the contexts of homesign interaction, either at home or at school.

These dimensions combine to form three ecological types: individual homesigners, homesigners in family ecologies and homesigners in peer ecologies. Characteristics and examples of each ecology are described below and represented diagrammatically in Figure 2.

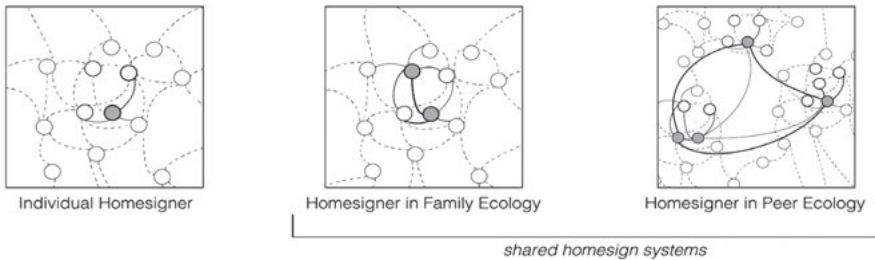


Figure 2: Communicative Ecologies of homesign systems.

In Figure 2, deaf homesigners are represented by grey-filled circles and hearing individuals by white circles. Communicative interactions in homesign are represented by solid lines, communicative interactions in the spoken languages are represented by dashed lines. In an *Individual homesigners ecology* (far left), the homesigner has a limited number of solid-line or homesign interactions, and these all occur with a hearing interlocutor. In a *Family communicative ecology* (center), the homesigner has interactions with another deaf homesigner, and the other members of their family have more interactions using the homesign system, represented by more solid-line connections. In the *Peer communicative ecology*, the homesigner may have few homesign interactions in the family environment, but they have homesign exchanges with other deaf homesigners in a community setting like school or work.

Deaf versus hearing signers

As illustrated in Figure 2, above, I make a critical distinction between hearing people who are related to homesigners, or who interact socially with homesigners, and individuals who are deaf and thus use their homesign system as their primary and only means of communication. While there are certainly hearing children of deaf parents who are homesigners and hearing children who are siblings of deaf homesigners who are fluent communicators with the deaf homesigner they

interact with regularly (though see Carrigan and Coppola (2017) and Richie et al. (2013; 2014) for evidence that even extended contact between hearing and deaf homesigners does not guarantee mutual comprehension or a shared lexicon of signs). For the purposes of this study, I emphasize this difference because deaf homesigners do not have an alternative, spoken language and they have not had access to spoken language or sign language input (as described above). A hearing child or adult may be a very proficient signer, but they also maintain the option of speaking at any time, and they have extensive experience interacting with other speakers of their native language. (see also Gagne 2017, for a discussion of the role inconsistent input for hearing children of deaf adult signers in Nicaragua).

Individual homesigners

Individual homesigners do not have regular interactions with other homesigner peers or homesigner relatives. Although hearing relatives and peers may gesture with them, studies of individual homesigners demonstrate that even over extended time, adult homesigners and their hearing relatives do not necessarily converge on a shared lexicon (Richie, Yang, and Coppola 2014). In a study of adult homesigners in Nicaragua, researchers found that hearing relatives of adult homesigners were not always adept at accurately comprehending homesign descriptions of short events. This appears to be moderated by the age at which the hearing relative or friend began communicating with the homesigner, as hearing siblings who were closer in age had better comprehension than hearing parents (Carrigan and Coppola 2017).

The individual child homesigner may rarely see a manual communication system that resembles what they produce (Flaherty et al. 2010, 2016). Their primary interlocutors communicate predominately using the spoken language(s) in the community. Thus the interaction that the individual child homesigner engages in is primarily as a producer of their homesign system, and as a recipient of modified co-speech gestures from hearing family and friends.

As individual child homesigners grow up, friends, siblings or other relatives gain more experience using a manual communication strategy, and their system develops through interaction with the individual homesigner. Thus older individual homesigners have more practice as both a producer and a receiver of signs, though this may vary extensively by individual (Coppola, Spaepen, and Goldin-Meadow 2013).

Significantly for the individual child homesigner, the parallel development of their own homesign system and the manual communication strategies used by their hearing communication partners diverges substantially from the typical language learning child. The individual homesigner has the most experience with their emergent communication system, and the most expertise relative to

older, hearing siblings and adults in their communicative ecology. They have less experience negotiating an interaction with another person who uses a similarly structured system. The repeated engagement with other less-experienced hearing interlocutors likely impacts the system that the homesigner gradually develops. They may pursue diverse strategies to make themselves understood, including frequent repetition and clarification. This study includes three children who are individual homesigners and do not interact with other deaf people.

Homesigners in family communicative ecologies

Homesigners who are part of a family communicative ecology have a different social environment from individual homesigner on several dimensions, including communicative input, communicative interaction, and immersion in a multi-modal communicative system. Deaf child homesigners in a family ecology have accessible input: they interact with a deaf adult who uses a homesign system. The homesigning child thus receives a visual communicative model, beginning at birth, from an adult whose only experience communicating is in the manual modality. Whether a homesigning parent knows their child is deaf or not, their only modality for communication is manual-visual, so they will sign to communicate with their child. In the case that their child is deaf, this means that the child sees more communicative input and that input is likely more systematic and structured than an individual homesigning child who is only able to observe the gestures that hearing people in their family produce when they speak.

In addition to receiving a communicative model, a child homesigner in a deaf family has a role as both a producer and receiver of a homesign system. This comes from the adult who is deaf, and also from siblings who have communicated with the deaf adult, presumably using gestures. The presence of more than one deaf person in a single family alters the balance of communication modality for the other hearing people in the family. Communication is more likely to happen in the manual modality, giving the child homesigner more exposure to interactions not only between themselves and another deaf person, but the opportunity to observe the deaf adult in their family interact with other hearing people in the family and community. The child homesigner in a deaf family has more exposure to what “works” in terms of a communicative strategy, meaning, what is interpretable to hearing interlocutors versus what isn’t successful. Child homesigners in Nebaj may interact more with other children, even if they have a deaf parent (see section 4.1). If one of the parents or adults in a family is deaf, however, this means that all of the hearing children (the siblings of the child homesigner) have experience communicating with that deaf adult. Thus even the hearing children the child interacts with may have greater fluency with a manual communication system than the hearing children that an individual child homesigner encounters. In a

family with deafness across multiple generations, the hearing parent of a child homesigner who has grown up with a deaf parent has a lifetime of experience using a manual communication when their child arrives, because they grew up with one parent who was deaf. This is the circumstance for one of two family homesign participants in this study.

Homesigners in peer communicative ecologies

Deaf students who attend school together are embedded in a communicative ecology that differs from both homesigners in family ecologies and individual homesigners along dimensions of input and interaction. The students often do not have regular input from a deaf adult homesigner, but they do interact with same-aged peer homesigners daily at school. They are thus producers and receivers of homesign systems, though the contact between homesign systems occurs in the context of school, rather than home. In addition to being both producer and receiver, students at the school encounter more diverse examples of peers who are deaf at school than within the context of a family with two or three deaf members. Though the actual number of homesign contacts may not be substantially higher than a child homesigner with deaf relatives, having deaf peers may be fundamentally different in quality because it may support an individual homesigner's sense of community and peer network. Deaf homesigning children become aware that there are other individuals who share their communication modality and these are not restricted to people in their household. Additionally, this diversity of deaf peers may support the convergence of formal conventions because of the pressure to increase comprehension between signers on common topics (though interaction between deaf students is not guaranteed, even when they are in the same classroom, Goico 2015).

These communicative ecologies are illustrated in the diagrams above, see Figure 2. The diagrams indicate whether the homesigner child receives homesign input from a homesign adult in their family, whether they interact with another homesigning peer or a homesigning sibling. If a homesigner lacks deaf family members or peers, they are primarily a producer of their system, and rarely see another homesign system nor negotiate interactions with another deaf person who relies exclusively on their homesign system to communicate. The diagrams also reflect the relative density of interactions that a homesigner might have, given the number of other deaf people in their local communicative ecology. The density of a communicative ecology interacts with the age of the deaf or hearing homesigners who are interlocutors. In families or communities with multiple deaf individuals of the same age – peers – there may be more interactions in the homesign system than in families or communities in which the homesigners are a combination of adults and children. This prediction is based on the frequent

observation that conversation between children and adults can be infrequent in many Maya communities, even when adults and children are in close physical proximity (Rogoff 1981). In other words, homesign interactions are likely to reflect broader cultural socio-communicative patterns in a community, with adults typically interacting with other adults and children typically interacting with same-aged peers (Rogoff 1981; Gaskins 1999).

4 Communicative ecologies and cultural context

4.1 Shared homesign in Nebaj

In addition to a general pattern of age-based interactions, there is a strong notion of family identity in Nebaj. Deaf people typically follow this pattern, identifying with their family and local community, rather than a community based on shared deafness. Within the family, children tend to socialize with children, and adults with adults, thus both age and kinship ties seem to predominate, rather than deafness, as an identity marker. This pattern of affiliation mirrors the structure of social relations in Nebaj more broadly (as well as other Maya communities in Guatemala, Tax 1963). Although local housing patterns have been affected by the civil war and migration (Stoll 2013; Ibáñez-Holtermann 2011), most residents of Nebaj, however, continue to live in small compounds occupied by multiple generations of extended family, regardless of their hearing status. Based on observations and informal interviews throughout my fieldwork, deafness itself does not serve as a strong marker of identity, compared with gender, age, religious affiliation and kinship. The relative lack of deafness as an identity marker may be partially attributed to the framing of deafness as a voluntary choice to not speak, rather than deafness *per se* (as described in the sociolinguistic sketch of Nebaj, this volume), but also mirrors the situation in other Mayan communities where researchers have noted that there is not a strong sense of deaf solidarity (Fox Tree 2009: 328). This situation offers a contrast to the Deaf community in the United States, in which deafness, and in particular, the use of sign language, is a strong or primary source of identity (Lane et al. 1996; Padden and Humphries 2006).

Deaf people in Nebaj are, however, immersed in multilingual, multimodal communicative worlds (see also Safar 2017). Within a single family, there may be three active communicative systems: spoken Ixil and the accompanying co-speech gestures, spoken Spanish and the accompanying co-speech gestures, and the family homesign system. The use of each system fluctuates, relative to the balance of deaf and hearing family members, the presence of adults versus

children, as well as the level of education of family members present, which affects the degree of fluency in spoken Spanish.

Patterns of language socialization typical of Nebaj¹⁰ also intersect with shared homesign systems. It is more common for children in Nebaj, regardless of hearing status, to interact with other children than adults, similar to observations from other Mayan communities (Gaskins 1999; Rogoff 1981). This means that even if a deaf child has a deaf adult relative like a parent or grandparent, it does not guarantee significant interaction between the two deaf people. This general trend – of children socializing other children more than adults actively socializing children – is affected by the size of the family. Two of the deaf children in Nebaj, Sara¹¹ and Alejandro, are part of smaller nuclear families – Sara has one older (hearing) brother, and Alejandro has only one older (hearing) brother. These are relatively small families, compared to many of the families I have visited in Nebaj. Sara has more interactions with her mother, who is also deaf, than many children might, simply because she does not have younger siblings to care for and her mother has a smaller household to maintain in terms of cooking, cleaning and laundry.

4.2 Child homesign participants from Nebaj

Individual child homesigners in Nebaj

Three of the child homesigner participants in this study are ‘individual homesigners’: they do not have deaf relatives, do not attend school with other deaf students and do not have any known contact with other deaf individuals. The oldest individual homesigner, Alejandro (age 13), briefly (and intermittently) attended a school with other deaf students, but now attends the regular elementary school near his house. He has an older half-sibling and lives with his mother who is hearing and communicates with him via spoken Ixil and using gestures. The two other individual homesigners, Jacinto (age 10) and Antonio (age 7) recently began attending their local elementary schools, without any other deaf students or interpreting services.

Jacinto has an older half-sister and a younger sister, both hearing; his older sister interacts with him using gestures when she is at home. She conducted several of the tasks during one session and was very comfortable communicating with her brother, eliciting many descriptions from him. Antonio has more siblings

¹⁰ These may be characteristic of many Mayan communities.

¹¹ All names of participants are pseudonyms.

than either Alejandro or Jacinto, and all are hearing. He spends a lot of time observing activity in his neighborhood and playing with similar-aged relatives and neighbors. Some of his older siblings gesture with him, but they report not always understanding what he is trying to communicate to them. While I have observed both successful and unsuccessful communication between Antonio and his siblings, I would require more ethnographic evidence to evaluate the assertion of his brothers and sisters regarding their comprehension of his signing. In her work on the natural sign systems that are shared by hearing and deaf people, Green (2014) notes that comprehension between deaf signers and their interlocutors is contingent on more than familiarity with the sign system, but also a commitment on the part of both conversation participants to make an effort for understanding. This is an area that I hope to pursue in future work, with more naturalistic interactions between child siblings and peers.

Homesigners in family ecologies in Nebaj

There are two families in this study with multiple generations of deafness. The Bernal Family (Figure 3a) is small compared to most families in Nebaj. The mother, Lucia is deaf, as is her daughter Sara (now age 11). The father, Abel, is a monolingual Ixil speaker. He has mentioned that Lucia may have a sister who is deaf, but I have not been able to verify this. Finally, Ramon (now age 14), Sara's brother, is hearing. Neither Abel, Sara's father, nor Lucia are literate, but both Ramon and Sara attend their local, regular school, where Sara is in classes with exclusively hearing students. Ramon is the only member of his family who reads, writes and speaks Spanish proficiently. He often serves as an interpreter and translator for the rest of the family. Sara regularly plays with a neighbor, Ana (age 9), who is hearing but gestures to communicate with Sara and Lucia when she is visiting the house. I have observed Lucia interacting with her neighbors and women who occasionally stop by to use the family's water supply. Lucia also describes interacting with less familiar acquaintances, for example, a man who buys the pigs that the family sometimes raises. She related haggling with the man and ultimately refusing to sell their pig because he attempted to offer her a far lower price than her neighbors.

The Marcos Family (Figure 3b) consists of three generations, including Pedro, now aged 82, his daughters and their families. One of Pedro's hearing daughters reports that he has an older brother who is also deaf. Both men married and had children. Pedro's wife (hearing) is deceased and all of his children are hearing, but two of his grandchildren (Rosa age 7 and Pedro age 2) are also deaf. Rosa began attending her local school a year ago, but has been reluctant to go regularly and frequently stays home with her mother to help around the house and take

care of Pedro and a new younger sister (hearing). As of August 2017, Rosa had begun attending the local school for special education with other deaf students.

Each family with multiple homesigners is represented in the family trees above. In the Bernal family, Lucia and her daughter Sara are deaf. In the Marcos family, Pedro and his brother Marco are deaf, as well as Pedro's granddaughter Rosa and his grandson Pedro. His daughter, Luisa, who is hearing, thus has a father who is deaf and two children who are deaf.

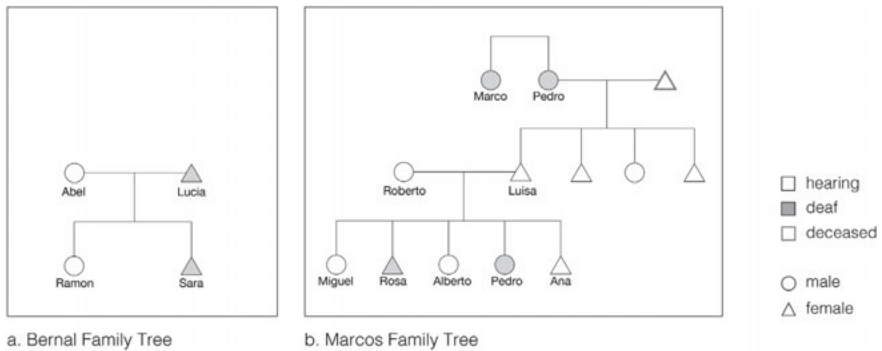


Figure 3: (a) Bernal Family Tree and (b) Marcos Family Tree.

Homesigners in peer ecologies in Nebaj

Four homesigners in the study attend the local school for special education (EOEE) together: Tomás (age 14) and Diego (age 16) are cousins, and Jose (age 10) and Juana (age 14) are siblings. Prior to a few years ago, Tomás and Diego lived in adjacent houses, although now they live quite a distance from each other. All four students have attended the EOEE school for at least 4 years. At the school, Tomás, Diego, Jose and Juana interact with up to four other deaf students. In past years, the deaf students were in different classrooms, but more recently all of the deaf students have been in a single classroom, despite variable age and academic experience.

There is a gender imbalance at the school, with significantly more male students who are deaf than female. Over the four years that I have worked at the school, there were three to six deaf students who are male, but Juana has been the only female deaf student. The boys play games together during free times and other hearing students at the school gesture with them where they are able (the school includes students with a range of cognitive and physical disabilities between ages 4 through 18). Though Juana sometimes interacts with the other male students who are deaf, she often chooses not to engage in their games, or is not included by the boys. I have observed Juana to cultivate casual friendships

with other students at the school who are hearing, particularly another female student who was roughly the same age. The two girls would remain in the classroom during recess, while the boys would be outside in the yard playing marbles or card games. Juana and the hearing student did gesture with each other during recess and class, often shielded by a workbook, propped up to hide their gestures from the boys.

Instruction at the school is provided in a combination of spoken Ixil and Spanish. One of the teachers at the school has been trained to teach special education and obtained an illustrated dictionary of Guatemalan Sign Language (LENSEGUA). For a period of time, the LENSEGUA manual alphabet was posted at the school, and some of the teachers occasionally use common signs (e.g., for ‘house’ and ‘sit’) when they are talking to deaf students. The students also have limited access to the illustrated dictionary by ASORGUA, the Guatemalan Association for the deaf, and Jacinto and Antonio have copies of an illustrated picture dictionary that I made for them to have at home. Few students at the school have made progress reading and writing Spanish. Tomás, Diego and Jose rarely use lexical signs from LENSEGUA with each other and I have never observed them to use LENSEGUA with any hearing family members.

5 Child homesign lexicons: elicitation methods and annotation

5.1 Lexical elicitation task

The data for this study were collected in June and July, 2015, December 2015, and June and July 2016. I travel to Nebaj for three to eight weeks each summer and spend time visiting with families and volunteering at the EOEE school. I stayed in a small hostel owned by a local family and traveled around Nebaj and to neighboring *aldeas* with friends from Nebaj who are native Ixil speakers. I visited families with at least one friend from the community who knows the family either through their relatives or neighbors.

Families and children were recruited through local contacts from Nebaj, particularly facilitated by Las Mujeres y Hombres por la Paz, a local collective of women and men. My visits with families in their homes lasted for up to three hours. I engaged participants in a variety of semi-structured elicitation, play and conversation. All of the sessions were recorded with the consent of participants. When visiting families, I took a set of toys and books that have been

used in other studies of homesigners in the United States, Turkey, Taiwan and Nicaragua (Goldin-Meadow et al. 2009; Coppola, Spaepen and Goldin-Meadow 2013). Participants also watched short video clips on a laptop and described them to an interlocutor. The primary interlocutor was either the author, or a deaf or hearing relative, friend or neighbor. When I was the interlocutor, I used Spanish to communicate with family members and gestures to communicate with homesigners. These were often simple conventional gestures, such as turning my hands over, in a palm-up gesture, to prompt a response or indicate a question, but also nods, points and pantomimed actions. The lexical elicitation task that I used to collect data for this study is fairly simple and required minimal instructions or prompting. All of the child participants appeared to understand the task.

Participants were given a book with photos of familiar animals, foods, vehicles, clothing, tools, people and places and encouraged to describe each picture. I took these photos in Nebaj during the first trip to the field so that the images would be familiar and identifiable to anyone from the area, some examples are presented in Figure 4. The photo book was one of the first items that many participants interacted with during sessions, as they enjoyed seeing images of everyday objects and items that they had in their homes and yards.



Figure 4: Sample images from the stimulus set. Stimulus set included: food (tomatoes, upper left), vehicles (truck, upper right), animals (pig, lower left), and utensils/tools (hatchet, lower right). All photos were taken by the author in Nebaj, Guatemala and were familiar to the participants in this study.

Although the full set of photos in the book includes 65 items from the following categories: people, animals, food, utensils/tools, structures/locations and vehicles, a subset of 12 items¹² were selected for analysis for this task. The stimuli items used in this analysis are presented in Table 2.

Table 2: Stimulus items for this analysis.

Type	Photo	Description	Quantity
Vehicle	Bicycle	man riding a bicycle	1
Vehicle	Car	car parked (no people in photo)	1
Vehicle	Truck	large truck parked (no people in photo)	1
Vehicle	Van	microbus van waiting for passengers (man on cell phone in photo)	1
Animal	Cat	grey cat sitting on the floor	1
Animal	Pig	pig in grass	1
Animal	Dog	dog sniffing a trashbag	1
Animal	Turkey	turkeys standing in pen	2
Food	Tomatoes	medium tomatoes (in a pile)	5
Food	Pineapple	pineapple	1
Food	Potatoes	small potatoes (in a pile)	3
Food	Chilies	chilies, red, green and yellow (in a pile)	12
Utensil/Tools	Mug	mug on a shelf	1
Utensil/Tools	Padlock	unlocked padlock with key	1
Utensil/Tools	Paintbrush	paintbrush	1
Utensil/Tools	Hatchet	hatchet	1

The aim of this task was to elicit homesign labels for the items in the photos. The task was completed by 9 child homesigners, presented in Table 3 below. As described above, homesigners rarely had trouble identifying the objects in the photos and producing a sign to describe them. In fact, they often produced more than one sign to describe the item in the photo. The annotation system for this task is described in section 5.2. If a signer did not recognize an item, or appeared to not have a sign for the item, frequently indicated by shrugging their shoulders or a slight wave of an open, flat hand, then the task would proceed. This task has

¹² These 12 items were selected because at least 7 out of 9 participants provided at least one sign for each photo and appeared to recognize the items in these photos. They were also chosen to achieve a balanced set of photos with 4 instances from each of the four categories. In ongoing work, the full set of 65 items is being analyzed.

been repeated with many participants longitudinally, across the four years.¹³ In future analyses, these data will be used to evaluate the stability of homesigner sign forms over time.

Table 3: Participants who completed the lexical elicitation task.

Participant	Age	Relatives who are deaf	School
Antonio	6;1	None	Regular Elementary School
Rosa	7;7	Grandfather, Younger Brother	EOEE (as of 2017, sporadic attendance prior)
Jacinto	9;3	None	Regular Elementary School
Jose	10;2	Sister (Juana)	EOEE
Sara	10;6	Mother	Regular Elementary School
Alejandro	12;0	None	Regular Elementary School
Tomás	13;4	Cousin (Diego)	EOEE
Juana	14;5	Brother (Jose)	EOEE
Diego	16;3	Cousin (Tomás)	EOEE

5.2 Annotating signs

Sign forms produced by the participants were annotated by hand using ELAN, an annotation software developed at the Max Planck Institute for Psycholinguistics in Nijmegen (Brugman and Russel 2004). The system for annotation is based on coding systems used for homesign systems and emerging sign languages described in Brentari et al. (2015) and Goldin-Meadow (2003).

All of the communicative signs elicited for a photo were annotated. For a sign to be considered communicative, it must have been directed to an interlocutor and it must not have been an imitation of the preceding form produced by the interlocutor or a functional act performed on a toy or tool. All signs that met the criteria above were annotated, including deictic forms – points used to draw

¹³ This means that this was not the first time that most of the participants had completed this task. For all but two participants (Jose and Juana), participants had completed this task one year earlier and in some cases for the preceding two or three summers. One reviewer asks whether this repetition could have affected participants' responses. While it is possible that completing the picture labeling tasks caused participants to be more consistent in their sign forms (because they became familiar with the stimulus photos over time) this is not something testable without comparing participants' individual stability longitudinally, something that is planned for future analyses.

attention to specific exemplars or locations in the immediate context – and discursive markers – used to indicate affirmation, negation and inquiry (e.g., head nods to indicate affirmation, palm-up gestures to indicate confusion or inquiry). This analysis focused on deictic and iconic signs. Signs that were annotated as discursive markers and signs that were extraneous to the task, including signs directed to other people present and longer narratives about the people, places or items in the photos were thus excluded from this analysis.

The majority (7 out of 9) of the participants produced 1 to 4 signs to describe each photo. Where participants provided longer descriptions and narratives about the photos, a decision was made between the coder – a trained, hearing research assistant from the Goldin-Meadow lab at the University of Chicago – and the author about whether the signs constituted a response to the stimuli photo or a comment about items and events in the surrounding context.¹⁴ The author was present at all elicitation sessions and could provide clarification about some interactions, however, where it was unclear what participants were referring to in a description, their signs were annotated as Q-Ref (indicating that the referent is unclear based on the context of the utterance) and the representational strategy as *Other*.

We coded each sign for its referential strategy. The referential strategy describes the relationship between a sign and its referent (see section 2.1). The majority of signs related to the referent through either indexicality or iconicity, thus the two primary categories were deictic signs and iconic signs. Iconic signs were further coded for the iconic relationship between the signer's hands and the referent using categories developed in Padden et al. (2013, 2015) and Hwang et al. (2017).

5.3 Indexical (deictic) signs

Deictic signs were a common strategy used by some, but not all of the participants (a result presented below in section 6.1). Deictic signs were used by participants

¹⁴ It is difficult to know whether participants are providing a “lexical item” or a description of the particular person, animal, object or event in a given photo. One way to address this in future studies is with an analysis of other semi-spontaneous conversational data from the same participants where they discuss similar topics. If they use the same form for the same referent in these other contexts, then we can be more confident that the sign form (or series of sign forms) is/are functioning like a lexical item in the system. This analysis, however, is outside the scope of this chapter, so we describe the strategies in the signs that were elicited without making a judgment about their status in the larger sign system.

when describing stimuli photos to indicate either an example of the item in the photo, physically present in the context, for example, a point to a dog in the yard, IX:DOG, to describe a photo of a dog. Participants also used deictic signs to indicate a prototypical location for the item in a stimulus photo, for example, a point to a road, IX:LOC-ROAD, to indicate that this is where they typically see cars, trucks, or vans. These signs also frequently indexed locations in their yard, or a neighbor's yard where they knew an animal or item could typically be found, e.g., a point to the neighbor's yard, IX:LOC-YARD where there a horse is often kept, even if the horse is not there presently, to describe a photo of a horse. Deictic signs indicating a physically present referent accounted for 32% (N=13) of all deictic signs while deictic signs indicating a typical location for a referent not physically present or not visible accounted for 67% (N=27) of deictic signs.¹⁵

Signers sometimes used pronominal pointing signs, to indicate themselves or others, for example to indicate that they like to eat spicy chilies, in a response to a photo of chilies, a signer might point to themselves, IX:PRO-1. Signers also produced pronominal points to refer to a person they associated with the item in the photo, for example, pointing to their father IX:PRO-3 to describe a photo of a hat worn by most men in Nebaj, or pointing to their aunt IX:PRO-3, in a description of a photo of a backstrap loom or weaving because their aunt weaves. Pronominal pointing signs (N=9) were excluded from this analysis. Significantly, however, all of these deictic signs are temporally or contextually contingent. They are only meaningful when the referent is physically present (in the example of a deictic gesture to an actual exemplar of a dog) or in the case that the interlocutor knows, for example, that those neighbors keep a horse in their yard. We explore this point further in the discussion.

5.4 Iconic signs

Our annotation system was comprised of four iconic strategies, signs that shared a form with one of four conventional gestures commonly produced by hearing Nebaj residents (see section 5.4.5) and one additional category for signs that were difficult to assign to one of the iconic strategies (see section 5.4.6). When the signer's body represented a human body, the sign was coded as using an *enactment* strategy. When the signer's body did not represent a human agent and their handshape represented a size or shape dimension of the referent, the sign was coded as using a *hand-as-object* strategy. If the signer used their body

¹⁵ In 1% of cases, we were unable to determine the referent of the deictic sign.

to represent the body of an animal and their hands to represent the body part of an animal, the sign was coded as using a *hand-as-body-part* strategy. Iconic signs that did not meet any of the criteria above were coded as *other*. These iconic strategies are summarized in Table 4 and described in detail with examples from the data in sections 4.4.1–4.4.4.

Table 4: Summary of Iconic Strategies used by Homesign Participants.

Iconic Strategy	Signer's body represents	Signer's hand resembles	Movement of the Sign resembles	Example
<i>Enactment: Hand-as-hand iconicity</i>	body of a human actor	the handshape that would be used to manipulate the referent	the movement of acting on or manipulating the referent	The sign PAINT in which the signer's body represents a human body and their hand resembles a human hand holding a paintbrush (see Figure 5). The movement of the sign resembles the movement of painting.
<i>Enactment: Hand-as-object iconicity</i>	body of a human actor	the shape of the referent	the movement of acting on or manipulating the referent	The sign PAINT in which the signer's body represents a human body and their hand resembles the shape of a paintbrush (see Figure 6). The movement of the sign also resembles the movement of painting.
<i>Hand-as-object iconicity (SASS)</i>		a size or shape dimension of the referent	sign is stationary in neutral space in front of the signer's torso or the movement of the two hands represents a size dimension	The sign SMALL-ROUND-SHAPE in which the signer's handshape resembles a small round object (see Figure 8)
<i>Hand-as-body-part iconicity</i>	body of an animal	the shape of a body part	Sign is stationary at an iconic location on the body, or movement traces the extent of the body part	The sign BEAK in which the signer's head represents the head of a bird and their hand resembles the shape and location of a beak (see Figure 9).

5.4.1 Enactment: Hand as hand iconicity

Enactment signs with hand-as-hand iconicity (*handling* in Padden et al. 2013, 2015; *manipulation* in Hwang et al. 2017) encoded an interaction between a human agent and the object. Three examples of this iconic strategy are provided in Figure 5. When the signer produced an enactment hand-as-hand sign, their body represented the body of a human acting on the referent, and their hands iconically resembled the handshape that would be used to act on or manipulate that referent. The movements of these signs resembled the movements that would occur during the manipulation of the referent, thus in the example of the sign STEER, below in Figure 5, the signer repeatedly moved his hands up and down slightly in the movement that would be used when driving a car. In the sign PAINT, the signer moved her hand up and down above her head, in the movement that would occur if someone were painting a vertical surface. Hand-as-hand signs included signs for acting directly on the referent (for example, the signs EAT and PAINT, in Figure 5), but also signs in which the handshape resembled a handshape for holding a tool to peel something such as a potato. These signs were very common throughout the dataset and were produced by all homesigners.



STEER



PAINT



EAT

Figure 5: Examples of enactment: hand-as-hand signs, including STEER (left photo) produced to label the photo of a car, PAINT (middle photo) produced to label the photo of a paintbrush and EAT (right photo) produced as part of a label for pineapple.

5.4.2 Enactment: Hand as object iconicity

Enactment signs with hand-as-object iconicity (*instrument* in Padden et al. 2013, 2015; *manipulation* in Hwang et al. 2017) also represented an interaction between a human agent and the referent. Three examples of hand-as-object iconicity are provided below in Figure 6. In these enactment signs the signer's body represented a human actor's body, similar to enactment signs with hand-as-hand iconicity. The signer's handshape configuration, however, resembled the shape of the object itself, rather than the handshape that would be used if one were manipulating the object. The movement of hand-as-object signs resembled the movement that would occur if the referent were being used to perform an action. Thus in the sign CHOP, below in Figure 6, the signer brought his hand downward in a short, vertical motion resembling the motion of chopping something. In the sign PEEL, the signer slid her hand up her arm. This movement resembled the movement that would occur if someone were peeling a potato. In the examples in Figure 6, all of the signs also include the secondary hand, often representing the entity being acted on by the signer in the manipulation. In future studies we will analyze whether it is more common for signers to use their non-dominant hand in this way for enactment: hand-as-object signs relative to enactment: hand-as-hand signs. Signs with enactment: hand-as-object iconicity were common throughout the dataset and were produced by all participants.



PEEL



PAINT



CHOP

Figure 6: Examples of enactment: hand-as-object signs, including PEEL (left photo) produced to label the photo of a potato, PAINT (middle photo) produced to label the photo of a paintbrush and CHOP (right photo) produced as part of a label for tomato.

Enactment strategies

For many signs with enactment iconicity, the same action can occur with both hand-as-hand iconicity and hand-as-object iconicity. Figures 5 and 6 both include examples of the sign PAINT, in Figure 5, the signer uses a hand-as-hand sign and in Figure 6, the signer uses a hand-as-object sign.

Padden and colleagues (2013) have documented systematic preferences for hand-as-hand iconicity or hand-as-object iconicity across the lexicon in a number of standard sign languages. Brentari et al. (2015) also cite the distribution of hand-as-hand versus hand-as-object dominance in the lexicon as a potential source of typological variation in established sign languages. In this volume, Safar and Petatillo Chan document the use of these iconic strategies in Yucatec Maya Sign Language (YMSL), finding that some dialects of YMSL (specifically the dialect used in Chicán) show a strong preference for instrument, or hand-as-object iconicity, in a survey of the lexicon. While we do not discuss the preference for a particular iconic strategy across the lexicons of child homesigners, we are investigating this in ongoing work (Rissman et al. 2017, 2018). In addition to a preference grounded in the language, Ortega and Özyürek (2016) observe that certain objects seem to elicit particular iconic strategies also in hearing gesturers. The interaction of the type of object and the general tendency across the lexicon of a system remains an open question for our future work.

The difference between hand-as-hand and hand-as-object iconicity has previously been studied in child homesign systems (Hunsicker and Goldin-Meadow 2013), where it is argued to mark a distinction between nouns and verbs. A similar pattern is reported in the shared homesign system of a group of siblings in Chiapas, Mexico (Haviland 2013). In these systems, hand-as-hand iconicity was used to refer to actions, while hand-as-object iconicity was used to refer to objects (Safar and Petatillo Chan, this volume, point out that an association between a particular iconic strategy and actions or objects does not automatically entail that the strategies are used to mark a grammatical distinction in the language). In the current study, grammatical distinctions were not the focus of the analysis. All of the stimulus photos included only the target item on a neutral background (sometimes one or more items, see Table 2). There was not a human agent in the photos using or acting on the objects, except for one item – bicycle, in which a person was riding the bicycle in the photo. In ongoing work, we are comparing the signs that homesigners use to describe photos and short video clips of stationary items, versus a person acting on the items, to better understand the strategies that signers use to distinguish actions from objects.

5.4.3 Hand as object iconicity (SASS)

When the signer's hands were not representing an action, either through the movement of the sign, or through an indication that the body represented a human actor, the signers often produced signs that iconically resembled a particular dimension of the referent. This could be the size of the referent, with a contrast between large and small, short and tall, or short and long. These signs also represented the shape of the referent, whether a flat object or a round object. These signs were coded as *hand-as-object* iconicity (*modeling* in Kendon 2004 or *object* in Hwang et al. 2017).

In other studies of standard, young, emerging and village sign languages, these forms are often referred to as size and shape specifiers (SASS), and they have been described for almost all of the sign systems that are currently documented (Klima and Bellugi 1979; Supalla 1982, though see Nyst 2007). In a 2016 study, Nyst presents an extensive taxonomy of SASS signs based on data from Adamorobe Sign Language (AdaSL), used in an Akan village in Ghana. Nyst (2016) identifies two kinds of iconicity: shape for shape depiction and distance for size depiction. Both of these types of depiction can occur with or without movement between two hands. In the following sections, we discuss these strategies in the dataset from Nebaj.

Hand-as-object signs with movement

In hand-as-object signs, movement of the hands represents the extent of the shape or a change of size, but not the movement that would be produced if a person were acting on the object or if the object were moving through space. In this dataset, very few hand-as-object signs involved movement, those that did often represented a size dimension, such as TALL, in which both hands were raised above a signer's head or long, in which the two hands moved apart to indicate a length dimension (see Figure 6). Hand-as-object signs with this kind of movement were only produced by two signers and occurred three times in this dataset.



TALL



LONG

Figure 7: Examples of hand-as-object sign showing a size dimension, TALL (left photo) produced to label the photo of a van.

Static hand-as-object signs

The remaining hand-as-object signs were static and involved one or two hands. The distance between two articulators represents a size dimension of the object (*distance for size* iconicity from Nyst 2016), or the configuration of one or two articulators represents the shape of an object (*shape for shape* iconicity from Nyst 2016). Examples of each kind of iconicity are given in Figure 8 below. These two iconic strategies could overlap, as seen in Figure 8c, in which the signer's sign indicates both the shape of the object, shape-for-shape iconicity and the size of the object – distance-for-size iconicity.



STATIC:
SMALL DIMENSION



STATIC:
SMALL SHAPE



STATIC:
LARGE SHAPE

Figure 8: Different Types of Iconicity in hand-as-object signs.

The left image shows *distance for size* iconicity, the signer indicates the length of a referent with the space between his hands. He describes a photo of a chili. The middle image *shape for shape* iconicity, the shape of the signers hand represents the shape of the referent. He describes a photo of a tomato. The right image shows *shape for shape* and *distance for size* iconicity, the shape formed by the signer's hand resembles the shape of the referent and the space between the two hands represents the size of the object. She describes a photo of a pineapple.

Static hand-as-object signs were produced frequently by the participants. They often used them in combination with an additional iconic sign, a process that has been described as compounding in Al-Sayid Bedouin Sign Language (ABSL), a young village sign language used in Israel (Sandler et al. 2011; Tkachman et al. 2013). The compounding process for ABSL (and also YMSL, Safar and Petatillo Chan, this volume) involves a SASS sign that is suffixed onto an iconic sign. The iconic sign typically resembles how the object is used. This strategy is also described in a family homesign system used in Chiapas, Mexico one strategy for marking nominal arguments (Haviland 2013). We plan to explore the question of the emergence of this strategy in child homesign in future work.

5.4.4 Hand as body part iconicity

The homesigner participants in the study used an additional iconic strategy, in which their body represented the body of a non-human entity, frequently an animal. They then used one or both hands to represent an additional body part of an animal. In Figure 9, for example, the signers use a hand to represent the mouth of a dog, the beak of a bird, and the feathers of a turkey. In these signs, the placement of the hands provides information about the body part that is being represented, and this relative location is what indicates that their body acts as a stand-in for the animal's body.

I have observed signers to occasionally use this strategy for inanimate items, for example, using the human head to represent the shape of a pineapple and a hand to represent the leaves coming out of the top of the pineapple, but in this dataset, this hand-as-part strategy was only used in descriptions of other animate referents.



BARK



BEAK



FEATHERS

Figure 9: Examples of hand-as-body-part signs. The left image shows the sign BARK, produced to describe a photo of a dog. The middle image shows the sign BEAK, produced to describe a photo of a turkey. The right photo shows the sign FEATHERS, also produced to describe a photo of a turkey.

5.4.5 Signs with the same form as conventional gestures used by Ixil speakers

Some signs produced by participants resembled conventional gestures used by hearing Ixil speakers in Nebaj (see Le Guen et al., this volume, for more discussion of these conventional gestures in Mesoamerica). The forms of conventional gestures were verified in at least two of three possible sources: an informal pilot study to collect emblems from hearing speakers of Ixil in the Nebaj community based on an emblem elicitation task described in Johnson et al. (1975) (Horton, unpublished data), a dictionary of conventional gestures in Mexico and Latin America (Meo-Zilio and Mejía 1981, 1983), and a descriptive account of regional sign systems proposed by Fox Tree (2009). There were four conventional signs (ANIMAL,¹⁶ BIRD, EAT and DRINK) that were attested in at least two of three of these sources and that were also common in the productions from deaf homesigner participants in this study. They are illustrated in Figure 10 and described in Table 5 below.

¹⁶ Le Guen (this volume) notes that the gestures that are glossed as BIRD and ANIMAL in this chapter are conventional gestures throughout Mesoamerica, used to refer to the size of an animal or bird. In this chapter, I refer to these forms with the gloss animal and bird, as I have not conducted a detailed analysis to determine whether the participants in this study appear to use this form to indicate size in the way that hearing speakers do when gesturing while talking.

Table 5: Summary of Conventional Forms.

Gloss	Form	Attested Sources	Iconic Strategy
EAT	Loose B-Hand waved in front of signer's mouth	Survey of co-speech emblems of Ixil speakers in Nebaj (Horton, unpublished data); Meo-Zilio & Mejía (1980: 79)	Other Iconic Strategy ¹⁷
DRINK	Hand in fist with Thumb extended, raised and moved toward and away from signer's mouth	Survey of co-speech emblems of Ixil speakers in Nebaj (Horton, unpublished data); Meo-Zilio & Mejía (1980: 52)	Enactment: hand-as-object
ANIMAL	B-hand, palm oriented to signer's midsagittal plane (several variants for place and movement)	Survey of co-speech emblems of Ixil speakers in Nebaj (Horton, unpublished data); Fox Tree (2009: 335, 341); Meo-Zilio & Mejía (1983: 54)	Other Iconic Strategy
BIRD	Curved, spread B-hand, palm oriented down, held at mid-chest height. Second hand: curved, spread B-hand, palm oriented up, held below the dominant hand.	Survey of co-speech emblems of Ixil speakers in Nebaj (Horton, unpublished data); Fox Tree (2009: 356) ¹⁸	hand-as-object (SASS) ¹⁹

While the conventional gestures for EAT and DRINK were easily elicited from hearing speakers of Ixil, the gesture for ANIMAL was not produced spontaneously by some of the hearing participants when they completed the emblem elicitation task, based on Johnson, Ekman, and Friesen (1975). This could be evidence for variability in the distribution of and familiarity with conventional co-speech gestures across the hearing community. Alternatively, this could be due to the participants' interpretation of the task and the typical use of these gestures to

¹⁷ Although the place of articulation of this sign is iconic (articulated at the mouth, with the mouth typically open), the waving movement at the mouth lacks a transparent relationship with the act of transferring food to the mouth, thus it was not considered iconic in our coding system.

¹⁸ Fox Tree describes a form that is similar to the form elicited for BIRD from multiple deaf signers and hearing Ixil speakers. The form that is illustrated in Fox Tree, however, represents the palm of the dominant hand facing outward, away from the signer's body. He reports that in Nahualá (Western Guatemala) this form is used to refer to infants, while in Chiapas it refers to corn/maize ears.

¹⁹ Le Guen et al. refer to these forms as manual classifiers (Le Guen et al., this volume) and note that the forms BIRD and ANIMAL are common throughout Mesoamerica



Figure 10: Signs that have the same form as conventional gestures used by hearing people in Nebaj. These are the signs for ANIMAL, BIRD, DRINK and EAT. Top row: child homesigners producing conventional gestures from the hearing community during the lexical elicitation task. Bottom Row: Hearing speakers of Ixil producing conventional gestures during emblem elicitation task.

provide size information about animals.²⁰ These data are also from a gesture elicitation task – hearing Ixil speakers were asked how they would use their hands to tell someone they were hungry, for example. It is still possible that in a comprehension version of this task, a speaker would easily understand and give a definition for the gestures that were unevenly produced in the elicitation task.

Conventional gestures need not be iconic, but many forms do resemble some component of their referent. For example, the conventional gesture glossed as DRINK represents a cup, or a hand holding a cup, bringing a drink to the mouth (see Figure 10). Conventional gesture forms may be less likely to encode particular distinctions between objects. For example, the same conventional EAT gesture was produced by some participants as a description for elicitation photos of both chilies and potatoes, which are notably different in size and shape, how they are processed and consumed, but both are things that can be eaten. Importantly,

²⁰ I thank a reviewer for pointing this out.

as noted in Table 5, above, some conventional gestures overlap with the other iconic coding categories – the conventional gesture for BIRD, which uses a hand-as-object iconic strategy, and the conventional gesture for DRINK, which uses an enactment iconic strategy – but in this data, when homesigners produced these forms they were coded as *signs from conventional gestures*, rather than enactment or hand-as-object signs.

5.4.6 Other iconic strategies

Participants did produce signs that appeared to be iconic, either in their place of articulation or movement, but which were not clearly iconically related to their referent using the strategies listed above. When signs did not clearly use one of the iconic strategies in our system, they were coded as Other-Iconic. These included signs for which the handshape did not iconically represent the object but the movement of the sign and its location represented the action of going or driving in a back and forth motion (typically used in descriptions of vehicles).

In the next section, we present the results of the data that were coded using the categories described above. Participants produced signs that varied in their iconic strategies and we begin by discussing the distribution of strategies for each individual (section 6.2) and then discuss whether participants associated particular iconic strategies with particular types of items from the stimulus set (section 6.3).

6 Results: Referential and iconic strategies in shared homesign systems in Nebaj

The nine participants (3 female, mean age 11;1) who completed the elicitation task for this study produced a total of 482 signs to describe the 12 stimulus photos listed in Table 2 (section 5.1). Among them, 37 of these signs were discourse markers, including head-nods to indicate agreement or palm-up gestures to indicate uncertainty; 61 signs were deictic, and were directed at the elicitation materials and 43 signs were unrelated to the task, either directed at other people or describing other events happening in the context. These signs (29% of the total number of signs) were excluded from further analysis.

In the following sections, we describe the distribution of referential and iconic strategies in this set of 328 signs. We begin by discussing the production of indexical (deictic) signs and iconic signs in section 6.1. In the next section, the distribution of the five iconic strategies described above (section 5.4) is presented. We then present

these iconic strategies relative to the category of the sign referent (animal, food, tool, vehicle) to address whether there is evidence for patterned iconicity in child homesign lexicons. In the final section we discuss the use of conventional gestures common to the hearing community in which homesigners are socialized.

6.1 Referential strategies in homesign systems: Indexical and iconic

In this section, we discuss the relationship between characteristics of the participant, particularly age, but also communicative ecology type – individual, family or community – and the use of indexical versus iconic referential strategies. The 328 signs that comprise the data were not evenly distributed across participants: the average number of signs per response for each individual ranged from 1.1 to 6.7, with a mean of 2.3 signs per response. The average number of signs per description are presented in Table 5.

Table 5: Rates of Signing – Including and Excluding Deictic Signs.

<i>Participant</i>	<i>Age</i>	Including Deictic Signs		Excluding Deictic Signs	
		<i>Mean signs per Description</i>	<i>Maximum signs in a Description</i>	<i>Mean signs per Description</i>	<i>Maximum signs in a Description</i>
Antonio*	6;1	2.1 (.2)	4	1.3 (.3)	2
Rosa*	7;7	6.7 (1.4)	22	1.8 (.6)	9
Jacinto	9;3	3.6 (.5)	8	2.1 (.2)	5
Jose	10;2	1.4 (.2)	3	1.4 (.2)	2
Sara	10;6	1.8 (.2)	4	1.6 (.2)	3
Alejandro	12;0	1.1 (.1)	2	1.1 (.1)	2
Tomás	13;4	1.1 (.1)	2	1.1 (.1)	2
Juana	14;5	1.1 (.1)	2	1.1 (.1)	2
Diego	16;3	1.9 (.2)	3	1.9 (.2)	3

*Antonio and Rosa both produced descriptions that consisted of only deictic signs

Most homesigners produced just over one sign per description, with a maximum description of 2-3 signs for any single description. There were three participants, however, who produced more signs per response than the other child homesigners, including Antonio (age 6;1, 2.1 signs per response), Jacinto (age 9;3, 3.6 signs per response) and Rosa (age 7;7, 6.7 signs per response). When we evaluated the distribution of referential strategies, either indexical or iconic, we found that

these were also the three participants who produced the most indexical (deictic) signs. For Rosa, 74% of her signs (N=79) were deictic, for Jacinto, 40% (N=23) of his signs were deictic and for Antonio, 39% (N=13) of his signs were deictic. Two of the participants (Antonio and Jacinto) are individual homesigners, while Rosa has deaf relatives (shared family homesign system). They are also the three youngest participants in the study.

When we excluded deictic signs, Jacinto, Antonio and Rosa produced iconic signs at similar rates to the other older homesigners. Based on a comparison of the rates of signing with and without deictic signs in Table 5, we conclude that younger homesigners are more likely to use deictic signs, but that they use these in addition to iconic signs.²¹ This result is discussed further in section 7.1. The remaining analyses are conducted on the subset of signs that involved an iconic referential strategy.

6.2 Iconic strategies in shared homesign

In this section, we discuss the relationship between characteristics of the participant, particularly their communicative ecology type – individual, family or community – and the proportion of the iconic strategies described in section 6.4 in all of the signs that they produced for the lexical task. For each individual, we calculated the proportion of enactment iconicity, including: hand-as-hand and hand-as-object, hand-as-object iconicity without enactment (similar to SASS signs) and hand-as-body-part iconicity as well as signs from conventional gestures and signs with other types of iconicity. The distribution of these strategies for each participant is shown in Figure 11 below. We discuss which iconic strategies were used by all participants, which strategies were less common, and which strategies vary by communicative ecology.

Enactment iconic strategies: hand-as-hand and hand-as-object

Signs with an enactment iconic strategy were the most common type of iconicity for the majority of the child homesign participants. All participants produced at least some signs with enactment iconicity, and for six out of nine signers (Antonio,

²¹ One reviewer notes that this could be an effect of the task. This is possible, that signers are inclined to indicate referents that are readily available in context when shown a picture of familiar items. I note, however, that all of the participants had equal opportunity to use either an iconic or deictic sign, as all completed the same task. Only the younger participants produced such high proportions of deictic signs.

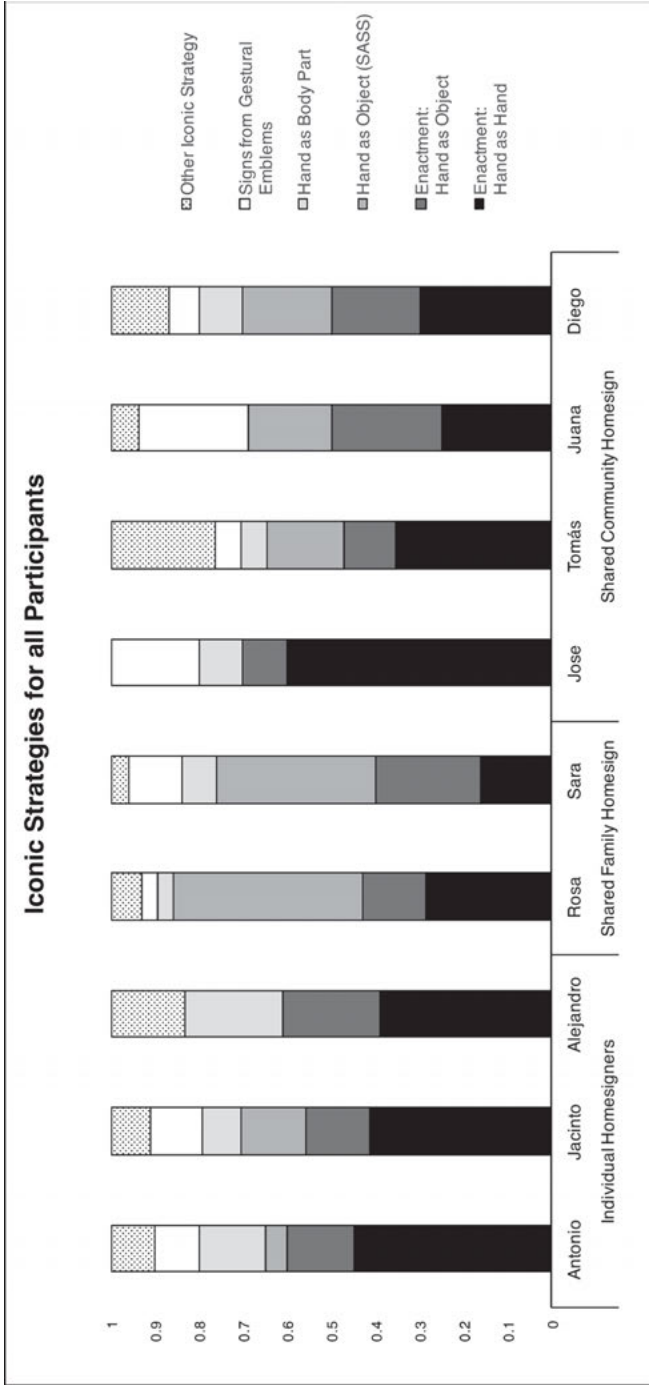


Figure 11: Distribution of iconic strategies for each participant. Individual homesigners appear on the left, family homesigners in the middle and community homesigners on the right. Four iconic strategies – enactment: hand-as-hand, enactment: hand-as-object, hand-as-object (SASS), hand-as-body-part and signs from conventional gestures, plus an additional category of other-iconic strategy, are shown as a proportion of all the iconic signs that the participant produced.

Jacinto, Alejandro, Jose, Juana and Diego), this constituted at least half of the signs that they produced. There were two types of enactment iconicity: forms in which the signer's hand resembled a human hand manipulating an object (hand-as-hand iconicity) and forms in which the signer's hand resembled the shape of the object (hand-as-object iconicity). The three individual homesigners used more hand-as-hand iconicity in their enactment signs than hand-as-object iconicity, while the remaining homesigners used hand-as-hand and hand-as-object iconicity at roughly equal rates (with the exception of Jose, a community homesigner who produced the highest rates of enactment: hand-as-hand signs as any of the other participants).

In general, enactment, in which the signer's body represents a human actor's body, is a very common iconic strategy when signers are labeling the familiar objects in this task. In section 6.3, we explore whether the type of referent affects the use of enactment signs.

Hand-as-object (SASS) iconic strategy

When the signers represented the shape or size of the referent with their hands, and their body or the movement of the sign did not resemble a human actor or an action associated with the object, the strategy was considered hand-as-object iconicity. This type of iconicity was used by all but two homesigners – Alejandro and Jose never produced a hand-as-object signs – however, not all signers produced an equal proportion of hand-as-object signs. Most notably, Sara and Rosa, the two family homesigners, produced a higher proportion of hand-as-object signs compared to the other groups of homesigners. We consider what kinds of referents were more likely to be described by hand-as-object signs in section 6.3. Importantly, while enactment signs are produced frequently by all signers, hand-as-object (SASS) is an iconic strategy that is unevenly used by signers, and is never used by some signers.

Hand-as-body-part iconic strategy

The homesigners in this study produced signs in which their body represented the body of an animal and their hand represented a salient body part of that animal, for example the mouth of a dog or the ears of a horse. These signs used the iconic strategy hand-as-body-part. All but one of the signers used this iconic strategy at least once, however, it was used most frequently by the individual homesigners, Antonio, Jacinto and Alejandro, and more rarely by the remaining participants. This strategy was used almost exclusively for the animal items in the stimulus set, in section 6.3.5 we explore what other iconic strategies were used to represent animals.

Signs with forms similar to conventional hearing co-speech gestures

All but one of the homesigners (Alejandro) produced signs with forms similar to conventional co-speech gestures. The proportion of signs from conventional co-speech gestures was highest for Jose, Juana and Sara. These three participants are all family homesigners (Jose and Juana attend school together with other homesigners as well). These three participants come from smaller families and have a close, hearing sibling who I have observed to communicate with them frequently using homesign. The hearing siblings in these families generally report to me that they are able to understand their sibling who is deaf, though I have not yet verified this with a comprehension measure or task. Importantly, this suggests the possibility that hearing siblings, who interact frequently with a same-aged deaf sibling, might be more likely to incorporate conventional gestures from the hearing community. This could thus become an avenue for the deaf homesigner to assimilate conventional co-speech gestures into their own system of signs.

Other iconic strategies

The final category of iconic strategies included signs that were iconic, but the relationship between the sign and its referent was not clearly one of the iconic strategies discussed above. These were primarily signs produced for vehicles that traced the movement of a vehicle, driving back and forth on a road, or a gesture that was glossed as SPICY, in which the signers hand, in a loose B-handshape shook up and down at the wrist, or waved, to indicate the spiciness of a food, like chilies.²²

In this section we have presented the results for iconic strategies for each of the individual participants in the study. The most substantive differences occur in the distribution of hand-as-object (SASS) signs, and other-iconic forms. All participants use enactment signs, with both hand-as-hand iconicity and hand-as-object iconicity. In the next section we address the relationship between participant characteristics (whether an individual, family or community homesigner), iconic strategy and referent type.

²² One reviewer notes that this is a conventionalized gesture for “hot” (spicy) and becomes the sign for chili in Yucatec Maya Sign Language (YMSL), an example of a gesture changing/adding meaning when it is taken up in a sign language.

6.3 Iconic strategies by referent type: Patterned iconicity

In this section, we present the distribution of iconic strategies by referent type. As discussed in section 5.1, there were four types of referents in this dataset: animals, foods, tools, and vehicles. Each category had four photos (see Table 2 for full descriptions and Figure 4 for examples). Based on the results from Hwang et al. (2017), we predicted that the category of iconic strategy might be systematically related to the type of referent. We present our results for each of our referent types, within each communicative ecology type, below.

6.3.1 Referent type and iconic strategies in individual homesign systems

The data for the three individual homesigners, Antonio (age 6;1), Jacinto (age 9;3) and Alejandro (age 12;0) are presented in Figure 12. The iconic strategies are organized by the category or type of the referent.

When we evaluate the distribution of iconic strategies for each of the referent types, we find that the individual homesigners Antonio, Jacinto and Alejandro show a strong preference for enactment: hand-as-hand strategies for foods and vehicles. They use roughly the same number of enactment: hand-as-hand and enactment: hand-as-object signs for tools. Antonio only produced iconic descriptions for two out of four possible animal stimulus photos, so his data were excluded for animal referents, but Jacinto and Alejandro both show a preference for hand-as-body-part iconicity for animals. Antonio and Jacinto also produced two signs from conventional gestures – EAT and DRINK (see Figure 10) – for various foods and for the stimulus item ‘mug’. They produced an iconic form for vehicles that was coded as iconic-other, this was often a sign tracing a path back and forth, typically taken by a car, motorcycle or truck on a nearby road.

Based on these results, the clearest evidence of patterned iconicity is in the category of animals, where there is a strong preference for a different iconic strategy, relative to the other categories. There appears to be a tendency for individual homesigners to use more enactment: hand-as-object signs for tools, a pattern we will explore further with more data in future analyses. Importantly, we do not observe the pattern reported in Hwang et al. (2017), for signers to use more hand-as-object (SASS) signs in descriptions of foods. Individual homesigners appear to prefer enactment signs for all referent types, except animals. We discuss this result further in section 7.2. In the next section, we present results for family homesigners.

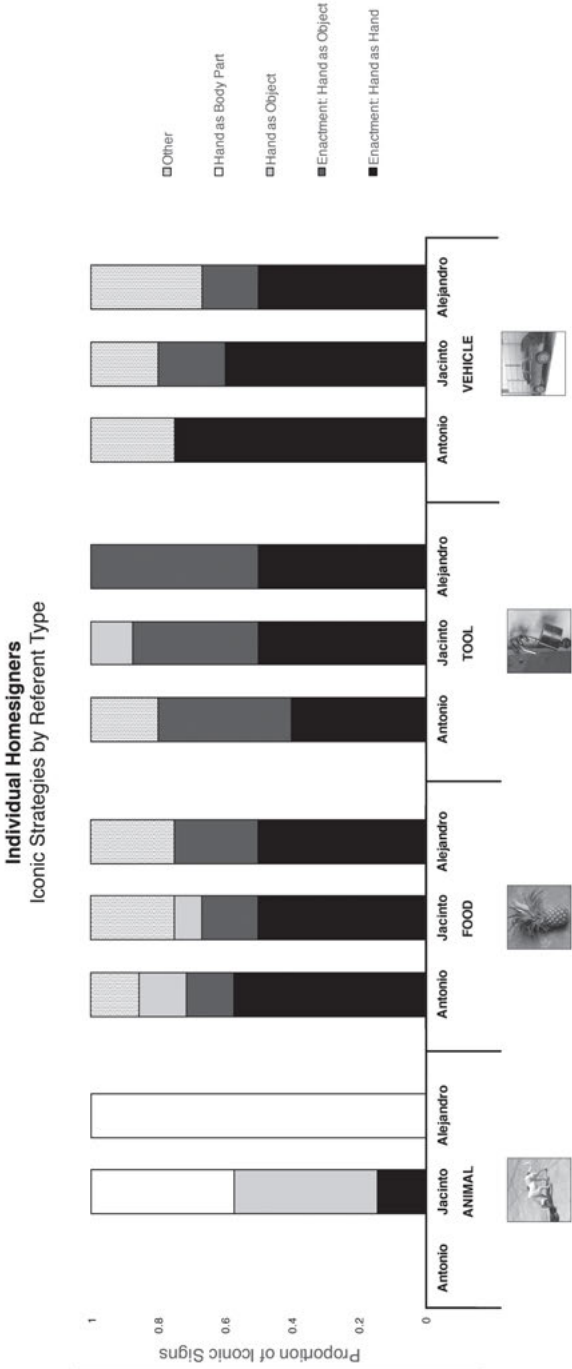


Figure 12: Iconic strategies by referent type for individual homesigners Antonio, Jacinto and Alejandro. The three individual homesigners show a strong preference for enactment iconic strategies for food, tools and vehicles. Jacinto and Alejandro use hand-as-body-part iconicity as well as hand-as-object (SASS) iconicity for animals. Antonio produced iconic signs only for two out of four animal stimulus photos, so his data were excluded here.

6.3.2 Referent type and iconic strategies used by homesigners in family ecologies

In the previous section, we find that individual homesigners did not show patterned iconicity for any referent type except animals. All of the participants tended to produce predominantly enactment iconic strategies in descriptions of food, tool and vehicle stimulus photos. In this section, we present the distribution of iconic strategies for family homesigners, Sara (age 10;6) and Rosa (age 7;7). We find that Sara and Rosa do use different iconic strategies for different referent types, their results are illustrated in Figure 13 below.

Sara and Rosa use different iconic strategies for different referent types. For animals, they used more hand-as-body-part signs (similar to the individual homesigners Antonio, Jacinto and Alejandro), but Sara and Rosa also produced hand-as-object (SASS) signs, often to represent the size of the animal. Sara also used the conventional gesture produced by hearing people to refer to animals (see section 5.4.5). For food referents, Sara and Rosa used primarily hand-as-object (SASS) signs. They also produced enactment signs for food referents. The hand-as-object signs for food typically resembled the shape of the food referent (see Figure 8 for examples). They used enactment signs for tools, using both hand-as-hand and hand-as-object iconicity for these referents. Rosa did not produce enough iconic signs for vehicles to include her data, describing only two out of four referents with iconic signs. Sara, however, used both enactment and hand-as-object (SASS) signs to describe vehicles. The hand-as-object (SASS) signs that Sara used for vehicles were typically descriptions of the size of the vehicle, like the sign TALL, illustrated in Figure 7.

Although they use a range of iconic strategies for different referent types, Sara and Rosa had a distribution of iconic strategies similar to the patterned iconicity observed for standard and village signers in Hwang et al. (2017). They used hand-as-body-part signs for animals, hand-as-object signs for foods and enactment signs for tools. We discuss these results across the groups further in section 7.2 after presenting the results for community homesigners in the next section.

6.3.3 Referent type and iconic strategies used by homesigners in peer ecologies

In the two preceding sections, we found that while individual homesigners only show patterned iconicity for one referent type – animals – family homesigners showed patterned iconicity for all four types of referents: animals, foods, tools and vehicles. In this section we provide the results for Jose (age 10;2), Tomás

Homesigners in Family Ecologies Iconic Strategies by Referent Type

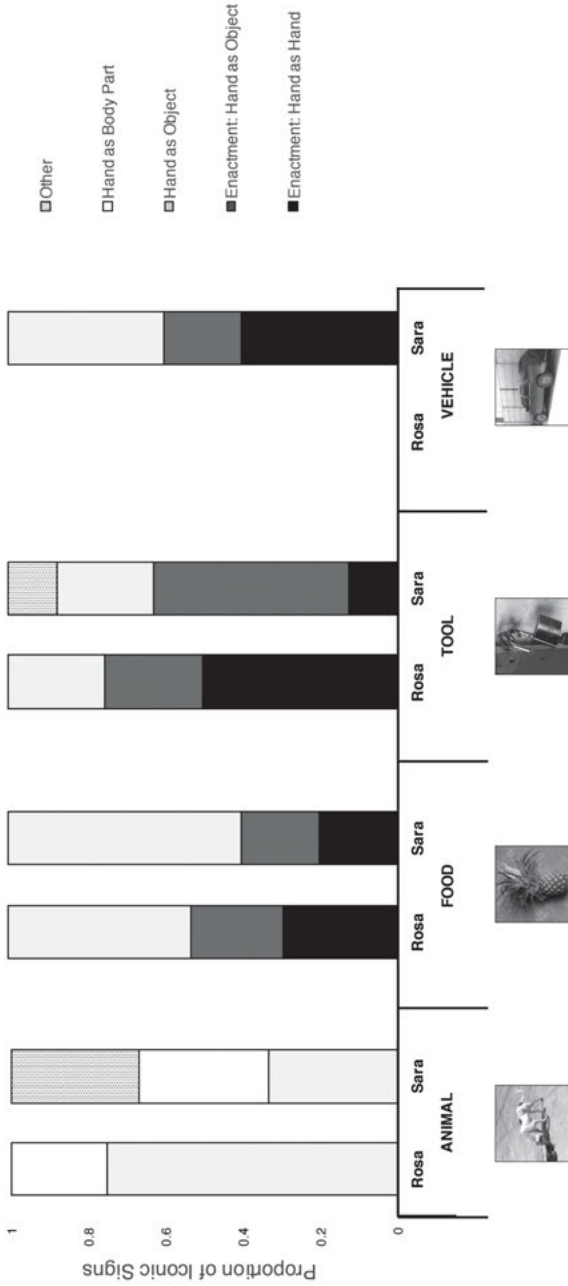


Figure 13: Iconic strategies by referent type for family homesigners Rosa and Sara. The two individual homesigners show a strong preference hand-as-body-part and hand-as-object (SASS) signs for descriptions of animals. They use both enactment: hand-as-hand and enactment: hand-as-object as well as hand-as-object strategies for foods. For tools, they produce primarily enactment strategies, though they differ on the iconic strategy. Rosa only produced iconic signs for two out of four vehicle stimulus photos, so her data were excluded here.

(age 13;4), Juana (age 14;5) and Diego (age 16;3), the four homesigners who attend school together at the EOEE school in Nebaj. Jose and Juana are also brother and sister, and therefore interact with each other at home, as well as in the school setting. The distribution of iconic strategies for Jose, Tomás, Juana and Diego are presented below in Figure 14.

Jose, Tomás, Juana and Diego used different iconic strategies for different referent types, as do Rosa and Sara, the family homesigners. The community homesigners, however, had different preferred strategies for some of the referent types. For animal referents, three out of four community homesigners (Jose, Tomás and Juana) often produced the conventional gesture used by hearing people to refer to animals (see section 5.4.5, Figure 10) (see Le Guen et al., this volume for a discussion of gender differences in use of manual classifiers. He observes that men use this form more often than women). Jose, Tomás and Diego also used hand-as-body-part signs for animals, Juana never used this iconic strategy. For food referents and tools, Tomás, Juana and Diego all used a similar pattern of iconic strategies. They showed a preference for hand-as-object (SASS) signs for food referents and a preference for enactment: hand-as-object signs for tool referents. Jose produced predominately enactment: hand-as-hand signs for both foods and tools. All of the community homesigners used enactment: hand-as-hand signs (specifically the sign STEER, illustrated in Figure 5) to describe the vehicles in the stimulus photo set.

It is interesting that, despite regular contact at school, the community homesigners do not have identical patterned iconicity in this set of signs. The particular outlier in this group is Jose, who not only attends school regularly, but also is Juana's sister, so has even more interaction with a homesigner than Tomás and Diego, who live across town from each other. Despite some variation, this group does still show patterned iconicity. They used a conventional gesture or hand-as-body-part signs for animals, hand-as-object (SASS) signs for foods and enactment: hand-as-object signs for tools and enactment: hand-as-hand signs for vehicles. Though the particular iconic strategies for specific referent types differed between community and family homesigners, both groups showed evidence for patterned iconicity. There was less evidence for patterned iconicity in the signs produced by individual homesigners. These results are summarized in the next section.

6.3.4 Signs from conventionalized co-speech gestures

Signs with the same form as conventionalized gestures were produced for animals, foods and tools. Three of the conventionalized gestures: ANIMAL, EAT, and DRINK (illustrated in Figure 10 and described in section 5.4.5) were produced

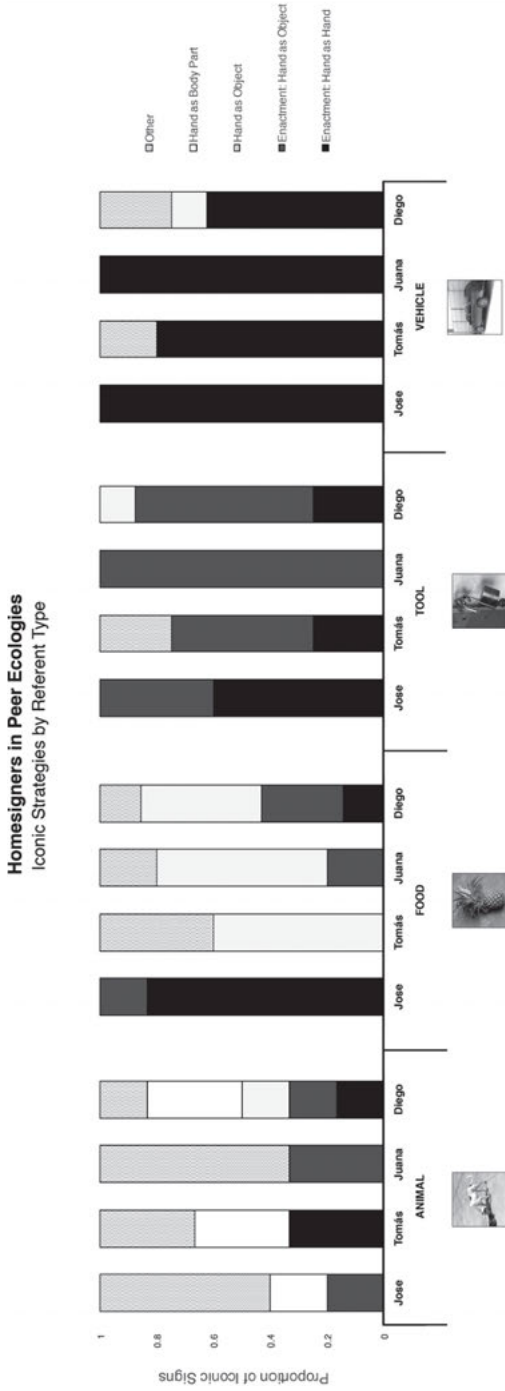


Figure 14: Iconic strategies by referent type for community homesigners Jose, Tomás, Juana and Diego. They produced diverse strategies for animal referents, frequently using other-iconic signs, as well as hand-as-body-part signs. For food, and tool referents, Tomás, Juana and Diego use similar patterns of iconic strategies: hand-as-object (SASS) for foods, enactment: hand as object for tools. For vehicle referents, all four community homesigners use predominately enactment: hand-as-hand signs.

at equal rates, each was produced 8 times. However, these signs were not evenly distributed across participants or stimuli items.

The ANIMAL sign was used by Sara, Jose and Juana for more than one animal in the stimulus set and by Rosa and Tomás once. The sign was never used to represent turkey, the one bird in the set of animals. Sara frequently combined the ANIMAL conventionalized gesture with a non-manual marker unique to each animal. Jose and Juana, who are brother and sister, both used the ANIMAL conventionalized gesture, but for different animals. The most common animal the animal conventionalized gesture was used for was a photo of a dog. The sign for BIRD, which resembled a conventional gesture used by Ixil speakers for birds (see Figure 10), was produced only once for turkey, by Juana.

The DRINK conventionalized gesture was used by all participants to describe the photo of a mug. The EAT conventionalized gesture was used frequently by Jacinto (N=6) for a variety of food stimuli and once each by Jose and Antonio. Thus the signs that formally resemble conventionalized gestures from the hearing community are taken up differently into the homesigners' systems. We discuss this result further in section 7.3 below.

6.3.5 Summary of iconic strategies by referent type across ecologies

In the preceding sections, we have presented the results for individual, family and community communicative ecologies. We found that individual homesigners showed weak evidence for patterned iconicity, based on the preference for a particular iconic strategy. They distinguished animal referents, using hand-as-body-part iconicity but tended to use enactment signs for all three remaining referent types. Family and community homesigners showed evidence for patterned iconicity for all referent types. These results are summarized in Table 6 below.

Table 6: Patterned Iconicity Results by Communicative Ecology.

	Animals	Foods*	Tools	Vehicles
Individual Homesigners	hand-as-body-part	enactment: hand-as-hand	enactment*	enactment: hand-as-hand
Family Homesigners	hand-as-object (SASS) / hand-as-body-part	hand-as-object (SASS)	enactment*	enactment / hand-as-object (SASS)
Community Homesigners	conventional gesture / hand-as-body-part	hand-as-object (SASS)	enactment: hand-as-object	enactment: hand-as-hand

Table 6: (continued)

	Animals	Foods*	Tools	Vehicles
Standard Sign Languages ²³	hand-as-body-part (<i>personification</i>) / as-object (<i>object</i>)	enactment*/hand- as-object (<i>manipula- tion/object</i>)	enactment: hand-as-hand (<i>manipulation</i>)	

Table 6 presents the primary strategy for each ecology, across each of the referent types. We note that some referent types seem to elicit the same iconic strategy across all ecologies, specifically, animal referents, which were most commonly described by hand-as-body-part. The family and community homesigners show a similar preference for hand-as-object iconicity for foods, while individual homesigners tended to use signs with enactment iconicity for foods, tools and vehicles. For tools, all participants tended to use signs with enactment iconicity, however, only community homesigners showed a preference for enactment: hand-as-object iconicity. In ongoing work we are evaluating the role of enactment: hand-as-hand versus enactment: hand-as-object iconicity in signs for tools, as many of the homesigners in this study show a stronger preference for enactment: hand-as-object iconicity than has been reported for other sign languages (see Hwang et al. 2017). In the following sections we summarize these results and discuss their implications for the relationship between communicative ecology and emergent lexicons.

7 Discussion

This study has addressed whether there is a relationship between the communicative ecology of a homesign system and properties of an emerging lexicon of signs. We asked whether a homesigner's communicative ecology might correspond to patterns of referential strategies, the distribution of iconic strategies – termed patterned iconicity – and if ecology might be associated with the use of sign forms based on conventional gestures from the larger hearing co-speech gestural repertoire.

We find that communicative ecology may be associated with the use of particular referential strategies, but that this also appears to be related to the age

²³ Standard Sign Languages surveyed in Hwang et al. (2017) included: German Sign Language (DGS), Japanese Sign Language (JSL) and American Sign Language (ASL).

of the homesigner. Communicative ecology was also related to patterns of iconic strategies for four types of referents: animals, foods, tools and vehicles. Individual homesigners did not distinguish these categories with different iconic strategies, but we find strong associations between particular iconic strategies and referent type for family homesigners and community homesigners. Some of these associations are similar to patterned iconicity in young and standard sign languages. We also presented preliminary evidence that many homesigners incorporate signs into their lexicon that resemble conventional gestures used by hearing speakers, but the distribution of these signs varied across and within groups and by referent type.

7.1 Referential strategies and communicative ecology

We compared two referential strategies in the signs produced by our child homesigner participants: indexical/deictic signs and iconic signs. Deictic signs consisted of points to actual items in the immediate context, for example, pointing to a pig in the yard, or points to a location where the same item was typically kept or placed, for example, pointing to the pen where the pig is typically kept. Le Guen (2011a) distinguishes these two kinds of pointing, describing the second type, in which the referent is not actually present in the environment, as “metonymic pointing”). These signs also included points to more distant locations where the referent from the photo could typically be found, such as pointing to the central square where it is common to see trucks or vans.

Deictic signs were overwhelmingly produced by the three youngest participants in this sample, two of whom (Antonio and Jacinto) were individual homesigners, and one (Rosa) who uses a shared family homesign system. This indexical referential strategy is grounded in a relationship of contiguity and/or a significant presumption of shared context. If the item is not physically present at the time that the homesigner points to its location, then the interlocutor must be familiar enough with the context to know what the homesigner refers to in the absence of the intended referent. Additionally, because indexical signs depend on contiguity, or co-presence, they are in many ways less “portable” (Haviland 2013) than other referential strategies.²⁴ An indexical strategy only functions for

²⁴ When a signer produces an indexical sign, I do not assume that this is the “lexical” sign for that referent in their homesign system. This analysis is simply assessing how frequently signers use particular referential strategies (e.g., indexical versus iconic) in the picture naming task. It would require additional evidence from a variety of signing contexts to establish whether a sign is a stable lexical item.

the signer when the item, or its typical location, is available. This could be the reason that older homesigners, and homesigners who interact with other peer homesigners at school are less likely to depend on indexical referential signs. They primarily interact with other homesigners in a setting where they may or may not have access to a physical example of the referent they wish to discuss, thus they must detach or ‘unground’ their signs from the affordances of a particular context or setting.

The younger homesigners who did produce a substantial number of deictic signs in the study rarely produced them in isolation, such that the deictic sign was the only sign that they used to label a photo. They produced these signs in addition to iconic signs that were used to describe the photos. Thus this could reflect a larger discursive strategy that these participants rely on to direct the attention of their interlocutor to an example of the referent in the context, in the case that their hearing interlocutor does not correctly interpret their iconic signs. In future analyses, we will explore whether this pattern persists in individual homesigners as they get older. Alternatively, this pattern could indicate a change in the homesigner’s understanding of the task.

7.2 Patterned iconicity and communicative ecology

We presented the distribution of four different iconic strategies – enactment (hand-as-hand or hand-as-object), hand-as-object (SASS) and hand-as-body-part, as well as signs from conventional co-speech gestural forms. These strategies could have been used equally across four types of referents in the stimulus set of items – animals, foods, tools and vehicles – but for family homesigners and community homesigners, they were not. Instead, these groups of homesigners used particular iconic strategies for different types of referents, showing evidence of patterned iconicity, found in young sign languages, village sign languages and standard sign languages (Hwang et al. 2017).

Although the five out of six homesigners who interact with another deaf homesigner, do use diverse iconic strategies, the three homesigners who do not interact with other deaf homesigners used primarily signs with enactment iconicity to describe referents including foods, tools and vehicles. Of these enactment signs, most used hand-as-hand iconicity (see Figure 5 for examples). Alejandro and Jacinto did use different iconic strategies for animal referents, specifically hand-as-body-part and hand-as-object signs. The prevalence of signs with enactment iconicity for individual homesigners could reflect their frequent interactions with other hearing relatives and friends who primarily use a spoken language for communication. As they have less experience using their hands to

communicate, and understanding the signs produced in the manual modality, it is possible that signs that mimic the actions performed with or by an object are the most comprehensible to the interlocutors of individual homesigners.

In her work on natural sign Nepal, Green describes the role of shared physical and social experiences, a signer's habitus, on sign forms. She suggests that certain sign forms could be considered *immanent* in the daily, routine activities common to members of the same community (Green 2014, see also Hanks 1990). Green (2014: 91) points out that "forms motivated by shared habituses need not be formally converted into linguistic knowledge to be nevertheless available and recognizable". This availability may shape the iconic strategies that are more referentially "successful" – reference is accurately resolved without further negotiation – compared to other iconic strategies. Green highlights a further dimension of interaction that is critical to communicative encounters between homesigners and their hearing interlocutors, specifically the degree to which both participants in the interaction are committed to achieving mutual understanding. I do not have the data to address this aspect of reference resolution, but it undoubtedly also shapes the forms that are ultimately used by homesigners.

The lexicons of individual homesigners are necessarily shaped by their interactions with hearing interlocutors, as they do not have contact with other deaf homesigners. Homesigners who do have regular contact with each other, however, might be affected by the interaction of their individual system, developed in contexts where they are not in contact with other homesigners, and the systems of other individuals. These homesigners also have the experience of negotiating interaction with another homesigner, who is equally experienced using their own homesign system, thus the homesigner is no longer the only interlocutor who uses primarily the manual modality for communication. When we consider the patterns of iconic strategies used by homesigners who interact with other homesigners – shared homesign systems – we find that they do use particular iconic strategies with different referent types. It appears, therefore, that interacting with another homesigner may support the emergence of patterned iconicity common to many sign languages (see Table 5).

The child homesigners in this study who use shared homesign systems do differ from the standard sign languages in Hwang et al. (2017) and the individual homesigners in their preference for enactment: hand-as-hand iconicity (for foods and tools) as well as the high rate of hand-as-hand (SASS) iconicity in signs for foods. In future work, we are investigating whether this preference extends across the lexicons of individual homesigners, similar to patterns described in Padden et al. (2013) and Brentari et al. (2015). Additionally, future work should investigate whether patterned iconicity is characteristic of utterances produced in more

naturalistic interactions, like conversations or narratives, outside of elicited tasks.

7.3 Communicative ecology and signs from conventional co-speech gestures

Although the child homesigners who used a shared homesign system were more likely to show evidence of patterned iconicity, they also diverged from the patterned iconicity described in Hwang et al. (2017) in some respects. One source of this divergence was the presence of signs that resembled existing conventional gestures commonly used in the hearing community in Nebaj. We found that there were homesigners from each of the three ecologies (individual, family and community) who used signs that resembled conventional gestures, however some homesigners rarely used these signs (Alejandro, Rosa, Tomás and Diego). Of the homesigners who did use signs that resembled conventional gestures, they were not used for the same types of referents across different communicative ecologies.

The two individual homesigners who used signs from conventional gestures (Antonio and Jacinto) almost exclusively used the conventional gesture for EAT (see Figure 10) to label food referents. The family homesigner, Sara, and the community homesigners, Jose and Juana, who used signs from conventional gestures used the conventional form for ANIMAL (see Figure 10) in descriptions of various animal stimulus photos.

In future work, we plan to investigate whether these sign forms from conventional gestures are more likely to be used by homesigners to mark a category of objects, and then be further modified to label a particular referent within the category, for example using the conventional sign for ANIMAL, followed by an iconic sign for BARK, to label a photo of a dog. All participants, except for Alejandro, used a sign from the conventional gesture for DRINK (see Figure 10) to describe a photo of a mug. In this particular set of signs, therefore, the use of signs from conventional gestures seems to be particular to individual homesigners and, potentially, particular objects.²⁵

²⁵ The association between a sign from a conventional gestures and a specific item is based on the almost universal use of the sign drink for the photo of a mug. A reviewer helpfully pointed out that the sign from the conventional gesture for drink might also be used for other drinking containers, like a bottle or cup (there were no examples in this subset of the data). This seems probable, and we will check this in the larger set of data, which includes other drinking containers.

8 Conclusion

We have discussed the association between participant age and referential strategy, communicative ecology and the emergence of patterned iconicity, and the use of signs from conventional gestures and communicative ecology. We find that, even with considerable individual variation, some groups show the beginnings of patterned iconicity, found across young and standard sign languages, we also describe some of the ways in which different kinds of homesigners adopt signs that resemble conventional gestures, and how this interacts with patterned iconicity and emergent categories in sign lexicons.

The results presented here provide evidence that the kinds of communicative interactions that child homesigners engage shape the homesign system that they develop in significant ways. Child homesigners who have even one additional deaf homesigner to communicate with may have a homesign system that looks very different from a child homesigner who has no interactions with other deaf homesigners. While this work is preliminary, we suggest that multiple homesigners in contact alters the nature of conversations for the deaf and the hearing people that participate in homesigners' social worlds. The increased experience that a hearing sibling or peer accrues when there are two deaf homesigners in their social network likely affects the signs that they go on to produce. Further, individual homesigners are not only the most experienced user of their system, they also rarely, if ever, are able to observe others interacting using their hands. Homesigners with deaf relatives (vertical transmission) or deaf peers (horizontal transmission) have the experience of seeing two other people talking to each other. This is a critical dimension to consider, alongside the characteristics discussed in this chapter: the age of the child homesigner, iconic affordances of particular referents and the uptake of conventional gestural material into a homesign system. Although the mini-lexicons described in this chapter are quite small, they provide valuable insight into the sophisticated strategies that child homesigners deploy to develop homesign systems for communicating with the hearing and deaf people in their lives. As they navigate conversation using a system that is unevenly distributed across interlocutors, it might seem obvious that the nature of these exchanges would shape the homesign system that the child uses, but it is often difficult to know where to look for a relationship between ecology and structure. This chapter offers several domains, including use of diverse referential strategies, the emergence of patterned iconicity and the use of conventional gestures, in which we might begin to observe these effects.

References

- Brentari, Diane, Chiara Branchini, Jordan Fenlon, Laura Horton, & Gladys Tang. 2015. Typology in sign languages: Can it be predictive? In *Proceedings from the 51st annual meeting of the Chicago Linguistics Society*. Chicago: Chicago Linguistic Society.
- Brugman, Hennie & Albert Russel. 2004. Annotating multi-media/multi-modal resources with ELAN. In *4th International Conference on Language Resources and Evaluation (LREC 2004)* 2065–2068.
- Carrigan, Emily & Marie Coppola. 2017. Successful communication does not drive language development: Evidence from adult homesign. *Cognition* 158. 10–27.
- Caselli, Naomi & Jennie Pyers. 2017. The road to language learning Is not entirely iconic: Iconicity, neighborhood density, and frequency facilitate acquisition of sign language. *Psychological Science* 28 (7). 979–987.
- Coppola, Marie & Elissa Newport. 2005. Grammatical Subjects in home sign: Abstract linguistic structure in adult primary gesture systems without linguistic input. *Proceedings of the National Academy of Sciences* 102 (52). 19249–19253.
- Coppola, Marie & Ann Senghas. 2010. Deixis in an emerging sign language. In Diane Brentari (ed.), *Sign Languages*, 543–569. Cambridge, UK: Cambridge University Press.
- Coppola, Marie, Elizabet Spaepen & Susan Goldin-Meadow. 2013. Communicating about quantity without a language model: Number devices in homesign grammar. *Cognitive Psychology* 67. 1–25.
- Coppola, Marie. 2002. *The emergence of the grammatical category of subject in home sign: Evidence from family-based gesture systems in Nicaragua*, Rochester, NY: University of Rochester dissertation.
- Deacon, Terrence. 1997. *The symbolic species: The co-evolution of language and the brain*. New York: W. W. Norton & Company.
- Emmorey, Karen. 2014. Iconicity as structure mapping. *Philosophical Transactions of the Royal Society: Biological Sciences* 369. 20130301.
- Flaherty, Molly, Dea Hunsicker & Susan Goldin-Meadow. 2016. The seeds of Nicaraguan Sign Language are not found in gesture. Poster presented at the 41st Boston University Conference on Language Development. Boston, MA.
- Flaherty, Molly & Susan Goldin-Meadow. 2010. Does input matter? Gesture and homesign in Nicaragua, China, Turkey, and the USA. In Andrew D. M. Smith, Marieke Schouwstra, Bart de Boer & Kenny Smith (eds.), *Proceedings of the Eighth Evolution of Language Conference*, 403–404. Singapore: World Scientific Publishing Co.
- Fox Tree, Erich. 2009. Meemul Tziji: An Indigenous Sign Language Complex of Mesoamerica. *Sign Language Studies* 9 (3). 324–366.
- Frishberg, Nancy. 1987. Home sign. In John Van Cleve (ed.), *Gallaudet encyclopedia of deaf people and deafness* (Vol. 3), 128–131. New York: McGraw Hill.
- Fusellier-Souza, Ivani. 2006. Emergence and development of signed languages: From a semiogenetic point of view. *Sign Language Studies* 7 (1). 30–56.
- Gagne, Deanna. 2017. *With a little help from my friends: The contributions of a peer language network on the conventionalization of space in an emerging language*. Storrs, CT: University of Connecticut dissertation.

- Gaskins, Suzanne. 1999. Children's daily lives in a Mayan village: A case study of culturally constructed roles and activities. In Artin Göncü (ed.), *Children's Engagement in the Social World: Sociocultural Perspectives*, 25–61. Cambridge: Cambridge University Press.
- Goico, Sara. 2015. Homesigns in Contact: Language emergence in mainstream classrooms in Iquitos, Peru. Paper presented at the Primer Coloquio sobre Lenguas de Señas Emergentes en Las Américas. September 11–12 2015, Mexico City, Mexico.
- Goldin-Meadow, Susan. 2003. *The resilience of language: What gesture creation in deaf children can tell us about how all children learn language*. New York: Psychology Press.
- Goldin-Meadow, Susan, Asli Özyürek, Burcu Sancar & Carolyn Mylander. 2009. Making language around the globe: A cross-linguistic study of homesign in the United States, China, and Turkey. In Jiansheng Guo, Elena Lieven, Nancy Budwig & Susan Ervin-Tripp (eds.), *Crosslinguistic approaches to the psychology of language: Research in the tradition of Dan Isaac Slobin*, 27–39. New York: Taylor & Francis.
- Goldin-Meadow, Susan & Carolyn Mylander. 1984. Gestural communication in deaf children: The effects and noneffects of parental input on early language development. *Monographs of the Society for Research in Child Development* 49.
- Goldin-Meadow, Susan & Carolyn Mylander. 1990. Beyond the input given: The child's role in the acquisition of language. *Language* 66 (2). 323–355.
- Green, E. Mara. 2014. *The Nature of Signs: Nepal's Deaf Society, Local Sign, and the Production of Communicative Sociality*. Berkeley, CA: University of California dissertation.
- Green, E. Mara. 2018. Performing gesture: The pragmatic functions of pantomimic and lexical repertoires in a natural sign narrative. *Gesture* 16 (2). 328–361.
- Hanks, William. 1990. *Referential Practice: Language and Lived Space Among the Maya*. Chicago: University of Chicago Press.
- Haugen, Einar. 2001. The Ecology of Language. In Alwin Fill & Peter Mühlhäusler (eds.), *The Ecolinguistics Reader: Language, Ecology, and Environment*, 57–66. London: Continuum.
- Haviland, John. 2013. The emerging grammar of nouns in a first generation sign language: Specification, iconicity, and syntax. *Gesture* 13 (3). 309–353.
- Hou, Lynn Y-S. 2016. "Making hands": Family sign languages in the San Juan Quiahije community. Austin, Texas: The University of Texas dissertation.
- Hunsicker, Dea & Susan Goldin-Meadow. 2012. Hierarchical structure in a self-created communication system: Building nominal constituents in homesign. *Language* 88 (4). 732–763.
- Hunsicker, Dea & Susan Goldin-Meadow. 2013. How handshape type can distinguish between nouns and verbs in homesign. *Gesture* 13 (3). 354–376.
- Hwang, So-One, Nozomi Tomita, Hope Morgan, Rabia Ergin, Deniz Ilkbasaran, Sharon Seegers, Ryan Lopic & Carol Padden. 2017. Of the body and the hands: Patterned iconicity for semantic categories. *Language and Cognition* 9 (4). 573–602.
- Ibáñez-Holtermann, Esther. 2011. *La Parada: Explaining Ixil day laborers in Virginia, Illegality, loss, hope and community*. Washington, DC: American University dissertation.
- Janzen, Terry & Shaffer, Barbara. 2002. Gesture as the substrate in the process of ASL grammaticalization. In Richard P. Meier, Kearsy Cormier and David Quinto-Pozos (eds.), *Modality and Structure in Signed and Spoken Languages*, 199–223. Cambridge, UK: Cambridge University Press.
- Johnson, Harold G., Paul Ekman & Wallace V. Friesen. 1975. Communicative body movements: American emblems. *Semiotica* 15. 335–353.

- Kendon, Adam. 2004. *Gesture: Visible action as utterance*. Cambridge: Cambridge University Press.
- Kisch, Shifra. 2008. "Deaf Discourse": The Social Construction of Deafness in a Bedouin Community in the Negev. *Medical Anthropology* 27 (3). 283–313.
- Kisch, Shifra. 2012. Demarcating generations of signers in the dynamic sociolinguistic landscape of a shared sign-language: The case of the Al-Sayyid Bedouin. In Ulrike Zeshan & Connie de vos (eds.). *Sign Languages in Village Communities: Anthropological and Linguistic Insights*. Boston: De Gruyter, 87–125.
- Klima, Edward & Ursula Bellugi. 1979. *The Signs of Language*. Cambridge, MA: Harvard University Press.
- Kusters, Annelies & Sahasrabudhe, Sujit. 2018. Language Ideologies on the difference between gesture and sign. *Language & Communication* 60. 44–63.
- Lane, Harlan, Robert Hoffmeister & Ben Bahan. 1996. *Journey into a Deaf World*. San Diego: Dawn Sign Press.
- Lepic, Ryan & Carol Padden. 2017. A-morphous iconicity. In Claire Bower, Laurence Horn & Raffaella Zanuttini (eds.). *On looking into words (and beyond): Structures, Relations, Analyses*, 489–516. Berlin: Language Science Press.
- Le Guen, Olivier. 2011. Modes of pointing to existing spaces and the use of frames of reference. *Gesture* 11 (3). 271–307.
- Magid, Rachel & Jennie Pyers. 2017. "I use it when I see it": The role of development and experience in Deaf and hearing children's understanding of iconic gesture. *Cognition* 162. 73–86.
- Meir, Irit, Wendy Sandler, Carol Padden & Mark Aronoff . 2010. Emerging Sign Languages. In Marc Marschark & Patricia Spencer (eds.). *The Oxford Handbook of Deaf Studies, Language, and Education, Vol. 2*, 267–280. Oxford: Oxford University Press.
- Mesh, Kate. 2017. *Points of comparison: What indicating gestures tell us about the origins of signs in San Juan Quiahije Chatino Sign Language*. Austin, Texas: The University of Texas dissertation.
- Meo-Zilio, Giovanni & Silvia Mejía. 1980. *Diccionario de Gestos: España e Hispanoamérica*, Volume 1. Bogotá: Instituto Caro y Cuervo.
- Meo-Zilio, Giovanni & Silvia Mejía. 1983. *Diccionario de Gestos: España e Hispanoamérica*, Volume 2. Bogotá: Instituto Caro y Cuervo.
- Mitchell, Ross & Michael Karchmer. 2004. Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies* 4 (2). 138–163.
- Morford, Jill. 1996. Insights to language from the study of gesture: A review of research on the gestural communication of non-signing deaf people. *Language and Communication* 16. 165–178.
- Mühlhäusler, Peter. 2003. *Language of Environment, Environment of Language: A Course in Ecolinguistics*. London: Battlebridge.
- Newport, Elissa L. & Ted Supalla. 2000. Sign Language Research at the Millennium. In Karen Emmorey and Harlan Lane (eds.). *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*, 580. Mahwah, N.J.: Lawrence Erlbaum Associates.
- Nonaka, Angela. 2009. Estimating size, scope, and membership of the speech/sign communities of undocumented indigenous/village sign languages: The Ban Khor case study. *Language and Communication* 29. 210–229.

- Nyst, Victoria. 2007. *A descriptive analysis of Adamorobe Sign Language (Ghana)*. Utrecht: Leiden University dissertation.
- Nyst, Victoria. 2012. Shared Sign Languages. In Bencie Woll, Markus Steinbach & Roland Pfau (eds.). *Sign Language: An International Handbook*, 552–573. Berlin: Mouton de Gruyter.
- Nyst, Victoria. 2016. Size and shape depictions in the manual modality: A taxonomy of iconic devices in Adamorobe Sign Language. *Semiotica* 210. 75–104.
- Nyst, Victoria, Kara Sylla & Moustapha Magassouba. 2012. Deaf signers in the Dogon, Mali. In Ulrike Zeshan & Connie de Vos (eds.). *Sign languages in village communities: Anthropological and linguistic insights*, 251–276. Berlin: Mouton de Gruyter.
- Occhino, Corrine, Benjamin Anible, Erin Wilkinson & Jill P. Morford. 2017. Iconicity is in the eye of the beholder: How language experience affects perceived iconicity. *Gesture* 16 (1). 100–126.
- Occhino, Corrine. 2017. An Introduction to Embodied Cognitive Phonology: Claw-5 Handshape Distribution in ASL and Libras. *Complutense Journal of English Studies* 25. 69–103.
- Orlansky, Michael & Bonvillian, John. 1984. The Role of Iconicity in Early Sign Language Acquisition. *The Journal of Speech & Hearing Disorders* 49. 287–292.
- Ortega, Gerardo, Sümer, Beyza, & Özyürek, Asli. 2017. Type of Iconicity Matters in the Vocabulary Development of Signing Children. *Developmental Psychology* 53 (1). 89–99.
- Ortega, Gerardo & Asli Özyürek. 2016. Generalisable patterns of gesture distinguish semantic categories in communication without language. In Anna Papafragou, Dan Grodner, Dan Mirman & John Trueswell (eds.). 1182–1187. *Proceedings of the 38th Annual Meeting of the Cognitive Science Society (CogSci 2016)*.
- Padden, Carol & Tom Humphries. 2006. *Inside Deaf Culture*. Cambridge: Harvard University Press.
- Padden, Carol, So-One Hwang, Ryan Lepic & Sharon Seegers. 2015. Tools for Language: patterned iconicity in sign language nouns and verbs. *Topics in Cognitive Science* 7 (1). 81–94.
- Padden, Carol, Irit Meir, So-One Hwang, Ryan Lepic, Sharon Seegers & Tori Sampson. 2013. Patterned iconicity in sign language lexicons. *Gesture* 13 (3). 287 – 308.
- Parmentier, Richard. 1994. *Signs in Society: Studies in Semiotic Anthropology*. Bloomington: Indiana University Press.
- Peirce, C. S. 1932. Division of signs. In C. Hartshorne and P. Weiss (eds.), *Collected Papers of C.S. Peirce*, (Vol. 2), 134–155. Cambridge, MA: Belknap/Harvard University Press.
- Perniss Pamela, Robin Thompson & Gabriella Vigliocco. 2010. Iconicity as a General Property of Language: Evidence from Spoken and Signed Languages. *Frontiers in Psychology* 1. 227.
- Pfau, Roland & Steinbach, Markus (eds.). 2006. Modality-independent and modality specific aspects of grammaticalization in sign languages. vol. 24. *Linguistics in Potsdam*. Potsdam, Germany.
- Pizzuto, Elena & Virginia Volterra. 2000. Iconicity and Transparency in Sign Languages: A Cross-linguistic Cross-cultural View. In, Karen Emmorey and Harlan Lane, (eds.). *The Signs of Language Revisited*, 261–285. Lawrence Erlbaum.
- Richie, Russell, Charles Yang & Marie Coppola. 2014. Modeling the emergence of lexicons in homesign systems. *Topics in Cognitive Science* 6. 183–195.
- Rissman, Lilia, Laura Horton & Susan Goldin-Meadow. 2017. Crosslinguistic biases shape the semantic structure of verbs: evidence from deaf homesigning children. Paper presentation at the 91st annual meeting of the Linguistic Society of America (Austin, TX).

- Rissman, Lilia, Laura Horton & Susan Goldin-Meadow. 2018. Conceptual categories scaffold verbal semantic structure: a cross-cultural study of child homesign. *The Evolution of Language: Proceedings of the 12th International Conference (EVLANGXII)*.
- Rogoff, Barbara. 1981. Adults and peers as agents of socialization: A highland Guatemala profile. *Ethos* 9 (1). 18–36.
- Safar, Josefina. 2017. Translanguaging in Yucatec Maya Signing Communities. *Applied Linguistics Review*. doi:<https://doi.org/10.1515/applirev-2017-0082>.
- Sandler, Wendy, Aronoff, Mark, Meir, Irit & Padden, Carol. 2011. The gradual emergence of phonological form in a new language. *Natural Language and Linguistic Theory* 29. 503–543.
- Sandler, Wendy & Diane Lillo-Martin. 2006. *Sign language and linguistic universals*. Cambridge, UK: Cambridge UP.
- Saussure, Ferdinand de, Charles Bally, Albert Sechehaye & Albert Riedlinger. 1986. *Course in General Linguistics*. LaSalle, Ill.: Open Court.
- Senghas, Ann. 2003. Intergenerational influence and ontogenetic development in the emergence of spatial grammar in Nicaraguan Sign Language. *Cognitive Development* 18. 511–531.
- Shaw, Emily & Yves Delaporte. 2010. New perspectives on the history of American Sign Language. *Sign Language Studies* 11 (2). 158–204.
- Stoll, David. 2013. *El Norte or bust!: How migration fever and microcredit produced a financial crash in a Latin American town*. Lanham, Maryland: Rowman & Littlefield Publishers, Inc.
- Supalla, Ted. 1982. *Structure and acquisition of verbs of motion and location in American Sign Language*. San Diego, California: University of California dissertation.
- Taub, Sarah. 2001. *Language from the body: iconicity and metaphor in American Sign Language*. Cambridge: Cambridge University Press.
- Thompson, Robin, David Vinson, Bencie Woll & Gabriella Vigliocco. 2012. The Road to Language Learning Is Iconic: Evidence From British Sign Language. *Psychological Science* 23 (12). 1443–1448.
- Tax, Sol. 1963. *Penny capitalism: A Guatemalan Indian economy*. Chicago: University of Chicago Press.
- Tkachman, Oksana & Wendy Sandler. 2013. The noun-verb distinction in two young sign languages. *Gesture* 13 (3). 253–286.
- Zeshan, Ulrike & Connie de vos (eds.). 2012. *Sign Languages in Village Communities: Anthropological and Linguistic Insights*. Boston: De Gruyter.
- Zeshan, Ulrike. 2010. Village sign languages – A commentary. In Napoli, Donna Jo & Mathur, Gaurav. (eds.). *Deaf Around the World: The impact of language*. Oxford: Oxford University Press.