The Points Of Language

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ABSTRACT

Signed languages display a variety of pointing signs that serve the functions of deictic and anaphoric pronouns, possessive and reflexive pronouns, demonstratives, locatives, determiners, body part labels, and verb agreement. We consider criteria for determining the linguistic status of pointing signs. Among those criteria are conventionality, indexicality, phonological compositionality, being subject to grammatical constraints, and marking the kinds of grammatical distinctions expected of pronouns. We conclude that first-person points meet all these proposed criteria, but that nonfirst person points are in part gestural. Lastly, we review evidence for the grammaticization over time of systems of pointing signs within signed languages.

KEYWORDS: Sign languages, Gesture, Pointing, Pronouns, Verb agreement.

The church of San Luigi dei Francesi is in Rome near the Piazza Navonna. In a side chapel, its decorations include a cycle of three paintings by Caravaggio depicting the life of St. Matthew. The first is *The Calling of St. Matthew* (*La Vocazione di San Matteo*, 1599–1600); see Figure 1. Caravaggio shows us the entry of Christ and St. Peter into a tavern; at a table sits a richly-dressed bearded man along with three companions, one of whom counts coins. The

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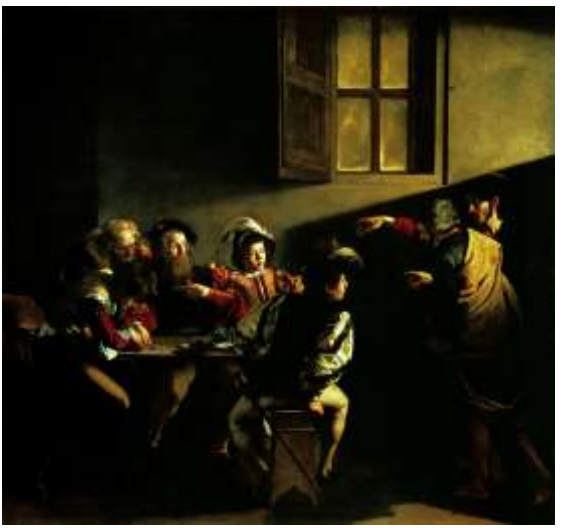
bearded man is apparently Matthew. At the time, he was a tax collector; hence his rich garb and the coins on the table. The scene that plays out before us is the moment when Christ calls Matthew to be one of his apostles (Matthew 9:9). It is the gestures of the main characters that are of particular interest to us now: Christ points to Matthew and looks at him; Peter echoes Christ's gesture. And Matthew points to himself with raised eyebrows, as if to say "Who? ME?!"

Caravaggio presumably intended these gestures as a representation of the co-speech gestures of his three protagonists. In the absence of spoken words, the narrative in his painting is driven by the gestures he depicted. While these gestures are communicative, for most linguists they would be considered paralinguistic, as would other co-speech manual activities and indeed some modulations of the speech signal itself.[1] In speech, pointing gestures and spoken words are easily segregated by virtue of the fact that they are produced by different articulators; for this reason and others (e.g. the fact that the direction of pointing is non-arbitrary), linguists have often paid little attention to pointing.



[1] Okrent (2002) discusses gestural elements in speech, such as vowel lengthening in a sentence such as *This issue is soooo complicated.* She develops criteria for identifying gestural elements within the speech stream and the sign stream.

Figure 1. Caravaggio's painting of *The Calling of St. Matthew* (1599–1600). Picture source: Wiki Commons.

The pointing signs used to refer to the signer, the addressee, and non-addressed participants in American Sign Language (ASL) and other signed languages are strikingly similar to the pointing gestures that accompany speech; see Figure 2. In sign, pointing is interspersed within the sign stream and cannot be overlooked; there is sometimes no easy basis for deciding what is a gesture and what is a word. So, how should these pointing signs be analyzed? Although they occur within the stream of manual actions taken to be signed words, they could be analyzed as paralinguistic gestures, like the co-speech cousins they resemble. After providing a more detailed explanation of the types of pointing used in sign languages, we will propose criteria by which we can determine whether pointing signs in a language such as ASL should be treated as linguistic rather than paralinguistic. These criteria will consider whether those signs are lexicalized (that is, part of the conventional vocabulary of signed languages) and/or grammaticized (that is, elements serving morphosyntactic functions akin to the inflectional endings that mark subject-verb agreement in Italian or English; compare *I walk to school* versus *he walks to school*).

I/me you she/her (present referent)

Figure 2. Deictic pointing signs in ASL.

Pointing signs such as those in Figure 2 are ubiquitous in signed languages (Cormier, 2012, for a review). They serve the same function as the deictic pronouns *I/me*, *you*, and *she/her* in English. Yet, pointing also seems to serve many other functions in signed languages. Some instances of pointing while signing are surely linguistic, but others may be gestural, analogous to the pointing gestures that accompany speech (and that are used by non-signers in

various non-speech contexts as well). For example, signers may use the index finger to touch part of a picture or object, in a careful, deliberate way. Such pointing can be interpreted as 'right here', but might well be analyzed as gestural. While many questions remain concerning how to distinguish different kinds of linguistic points, a fair amount is known about them (see Pfau & Steinbach 2006 for detailed discussion). Importantly, the gestural pointing used in non-signing communities may be a precursor to linguistic points. Thus the study of pointing in signed languages gives us a window into how gestural elements become linguistic over time. This issue will be raised in the latter part of the current article.

As Caravaggio's painting shows, gestural points appear to be quite similar to the pointing signs of ASL and other signed languages. When we look across signed languages, there is striking cross-linguistic similarity in these pointing signs, due perhaps to the gestural resources on which signed languages have drawn as they have emerged. These crosslinguistic similarities contrast with the diversity of spoken language pronouns (McBurney, 2002). Notwithstanding the similarities across signed languages in the form and function of pointing signs, we will see that there are interesting crosslinguistic differences amongst signed languages in the form and grammar of pointing signs. We begin with a discussion of the types of pointing signs found in signed languages.

A Typology of Pointing Signs

Table 1 displays just the subject pronouns of English and Portuguese. There are obvious differences in the phonological shape of pronouns in these two languages. There are also obvious differences between the languages in the distinctions that are marked in their respective pronominal systems, such that in standard English second-person pronouns do not mark number (although there are dialectal forms such as singular *you* versus plural *y'all* in southern American English). Unlike English, Portuguese distinguishes gender in its third-person plural pronouns. Unlike Portuguese, English has a third-person inanimate pronoun *it*. Yet there are also important commonalities across the two languages. Both languages mark person (first versus second versus third), number, and (in the third person) gender. Both languages have non-compositional first-person plurals, that is, first-person plural pronouns that cannot be broken down into a first-person marker followed by a plural marker.

	Singular	Plural	Singular	Plural
1st	I	We	eu	nós
2nd	you	You	tu (fam.) você (formal)	vocês
3rd	he/she/it	They	ele/ela	eles/elas

Table 1: Subject pronouns in English and Portuguese.

As McBurney (2002) has noted, the diversity of pronouns in spoken languages that is evident just from this simple comparison of English and Portuguese contrasts with impressive similarities in the form and function of pointing signs in signed languages. The ubiquity and similarity of pointing signs across sign languages might suggest that these signs have a special status, different from pronouns in spoken languages. However, it is not the case that pointing is unifunctional in sign languages. Rather, the indexical pointing sign (which we label IX) has a multitude of uses. Furthermore, other signs may be produced in, toward, or with respect to locations in space, and in this sense they can be said to point as well. We now describe some of the uses of pointing that have been observed in signed languages. Most of these uses are found in a wide range of sign languages, although our examples largely come from ASL.

Points to present persons: personal pronouns. As we have already mentioned (and will elaborate below), points to persons are usually treated as pronouns (translated as 'me', 'you', 's/he', etc.). These points generally have the same function as pronouns (that is, to pick out particular referents); and they are grammatically constrained in the way that pronouns are in spoken languages. These issues will also be discussed below.

Points to non-present persons: personal pronouns. To refer to a person who is not present in the situation of the discourse, signers will frequently name or establish the role of that person in the discourse by using an arbitrary location in the signing space. In example (1), the referent Mary is associated with

location *a* on the signer's left, whereas Sue is associated with location *b* on the right. Subsequent points directed toward these locations can be taken as pronouns. These pronouns, like points to present referents, are functionally and grammatically like spoken language pronouns. However, both types of signed pronouns are different from spoken pronouns in a very important respect. While third-person pronouns in spoken languages may be said to denote a class of referents (e.g. *she* = one member of the set of female humans), signed points other than first-person points pick out particular referents. In conversation, spoken language pronouns are of course intended to do the same, but the forms themselves are not distinctive enough to be unambiguous in many contexts. In actual usage, signed pronouns too may sometimes be ambiguous, for example, if more than one referent is associated with a general region of space. However, there is in many cases the potential for unambiguous reference with signed pronouns whose counterparts would be ambiguous in speech; again see example 1. This difference between signed and spoken pronouns has been the focus of some attention in the sign linguistics literature (e.g. Lillo-Martin & Klima, 1990).

(1) YESTERDAY MARY IX(a) SUE IX(b) TEACH CLASS.
IX(a) TEACH MATH, IX(b) TEACH SCIENCE.
'Yesterday, Mary and Sue taught classes.
She (= Mary) taught math, and she (= Sue) taught science.[2]

Points with different handshapes: possessive and reflexive pronouns. Personal and locative pronouns use a pointing index finger handshape. In ASL, possessives 'point' using the palm of a flat hand (a "B-hand" with the thumb extended), as we describe below. A fisted handshape with the thumb extended () is used to point with the knuckles in reflexive signs (translated as 'myself', 'yourself', or 'him-/herself').

Points to locations: locative pronouns. Just as human referents can be associated with different locations in signing space, so can locative referents (e.g. the city of Boston or a particular school). A point to one of these locations functions as a locative pronoun (analogous to English *there*). There has been some discussion about differences in form between personal and locative

[2] Throughout this paper, the English labels for ASL signs will appear in small caps, as in the sign TEACH. In describing these signs, we sometimes label their handshapes according to the values those handshapes have in ASL's manual alphabet, as is standard in the linguistic literature on ASL.

pronouns (see Pfau 2011). In general, personal pronouns use a pointing handshape with the palm perpendicular to the ground, and a short, straight movement. Locative pronouns may have the palm parallel to the ground (palm down), with an arced, variable-length movement representing degree of distance (MacLaughlin 1997). Locative pronouns tend to be freer in the locations to which they can point; personal pronouns are not typically found directed toward the same variety of locations used for locative pronouns because of the physical restrictions on the locations people can occupy, but this may not be a grammatical restriction.

Points to locations: locatives; body part lexical items. One version of the sign for HERE in ASL involves pointing to the ground with two index-finger hands. Likewise, UP, DOWN, LEFT, and RIGHT are signed by pointing using one index-finger hand in these directions. Many body parts—particularly those in the upper half of the body—are named by pointing (NOSE, EYE, THROAT, etc.). These signs point to an instance of the body part in question; they do not necessarily point to the actual body part being referred to. For example, when producing the sign EYE with reference to the addressee's eye, the signer still points to his/her own eye. Some body-part names involve a different movement (FINGER) and/or handshape (ARM), but nonetheless involve directing attention to a particular location (pointing). Still other body part signs are ordinary lexical items that do not involve pointing.

Points with nouns: determiners. A pointing sign may be used as the only reference to an argument in a sentence (IX-a GO-OUT 'he went out'; MOTHER LOVE IX(baby) 'the mother loves the baby'). In such cases, the pronominal analysis is well motivated. However, points may also be used together with nouns (IX-a BOY GO-OUT 'the boy went out'). Some researchers (MacLaughlin, 1997) argue that such prenominal points function as determiners—specifically, as definite articles similar to English *the*. Other researchers agree that some points function as determiners, but claim that the determiner points are not restricted to prenominal position (Zimmer & Patschke, 1990). Yet others argue that no points are definite articles, but that some usages are possibly akin to demonstratives, like English *this/that* (Koulidobrova, 2012). Whatever the correct analysis, it seems clear that some points have a non-pronominal function within noun phrases.

Other signs that can point: 'verb agreement.' Some verbs that are, in their citation forms, produced in neutral spatial locations, have other forms in which

movement and palm orientation 'point' toward specific spatial locations associated with the verb's arguments. This is a morphosyntactic process commonly called 'agreement'. Verbs that take human arguments typically start at the location associated with their subject referent, and move toward the location associated with their (human) object. Lillo-Martin & Meier (2011) characterize this process as a type of person marking, much as *compro* 'I buy' is the first-person singular present indicative form of the Italian verb *comprare* 'to buy', whereas *compri* 'you buy' is the second-person form. Similarly, movement at or between locations in the signing space that are used to represent locations in the real world may indicate the path or location of an activity (e.g. driving from Los Angeles to San Diego or staying in one's room). Some predicates (including adjectives) can be signed at particular locations to indicate distinctions between referents (e.g. these two cars are blue, but this third one is red). In addition to lexical verbs/predicates, some sign languages (e.g. Catalan Sign Language and Brazilian Sign Language, but not ASL) have pointing signs that have been analyzed as auxiliaries; these signs move between subject and object to show agreement, but occur together with a main (contentful) verb (see, e.g. Quadros & Quer, 2008; also Pfau & Steinbach, 2006).

Assessing the Linguistic Status of Pointing Signs

How do we decide the linguistic status of the kinds of pointing signs that we have just listed? Meier & Lillo-Martin (2010) built upon a discussion in Perlmutter (1991) by suggesting five criteria for assessing the linguistic status of pointing signs. They are:

1) Are the pointing signs conventional within a particular linguistic community?
2) How indexical are those pointing signs? Do they point well?
3) Are those pointing signs phonologically compositional? Do they exhibit duality of patterning?
4) Are their distributions in sentences grammatically constrained?
5) What grammatical distinctions do they mark? For example, are those grammatical distinctions similar to those marked by pronouns in spoken languages?

Conventionality. The vocabulary of a familiar spoken language like English or Italian is conventional within its community of users; for example, English-speakers must learn to use the word *cat* and Italian speakers must learn *gatto*. And, even if an American of Italian ancestry happens to know *gatto*, he or she will not substitute the Italian word into a conversation in English (except perhaps in the case of codeswitching between languages). The same is true for signed languages such as ASL and Italian Sign Language (*Lingua Italiana dei Segni* or LIS). The vocabularies of ASL and LIS are learned. The ASL sign CAT has the signer's cheek as its place of articulation and seems to sketch the whiskers of the animal. The LIS sign GATTO is articulated on the nondominant hand; the fingers of the dominant hand (all fingers spread and bent at the second knuckle) seem (to our eyes at least) to claw the back of the nondominant hand. Thus, even highly iconic signs can differ substantially across signed languages.[3]

However, pointing signs present a problem for linguistic analysis. Simple pointing signs translated as 'me', 'you', or 'him/her' are typically very similar across signed languages and likewise are similar to the gestures that a hearing person might use in accompaniment to a spoken conversation. In their forms these pointing signs present little obvious evidence to suggest that they have been conventionalized within particular signing communities. But when we look to other classes of pointing signs, we find systematic differences across signed languages. For example, ASL and LIS have distinct possessive pronouns. In ASL, the possessive pronoun has a flat hand in which the palm is oriented toward a location associated with the possessor (i.e. the palm points toward a location associated with the possessor). The LIS possessive pronoun has an extended index finger (1, just like the simple pronouns in that language), but is distinguished from those simple pronouns by a twisting rotation of the forearm in the direction of a location associated with the possessor (Radutzky, 1992). Like ASL, Brazilian Sign Language has a flat-hand possessive pronoun, but that pronoun is restricted to the first person; for non-first person referents, the possessive can have either an extended index

[3] For video of this LIS sign, see the *Dizionario elettronico di base binlingue Lingua Italiana dei Segni – italiano*:
http://elisdiz.eurac.edu/diz/Default.aspx?ids=gb5205455kfdcw455vzzsxi5&idf=ita.n.gatto.1&mm=1&sm=1

finger (1) or a so-called P-handshape (P) in which the first and second fingers are extended and spread, and in which the thumb contacts the base of the second finger (Pizzio, Rezende, & Quadros, 2009). As we will see in the next section, plural pronouns—notably first person plural pronouns such as the ASL signs WE and OUR—present strong evidence of being conventionalized within particular signed languages.

So-called "directional verbs" can also point to locations associated with referents of their arguments; so the ASL verb GIVE can move from a location associated with the donor (or grammatical subject) to a location associated with the recipient (or indirect object). Some directional verbs such as GIVE or TAKE might be confused with gestural representations of the actions that they describe; both have handshapes that a nonsigner might use in manipulating an object. But other directional verbs in ASL have handshapes that are arbitrary. A second directional verb for giving in ASL—a verb sometimes glossed as GIFT—has an X-handshape (X, a crooked first finger, with all other fingers fisted). This verb, which can also indicate locations of its subject and indirect object, is clearly conventional within the ASL-signing community.

However, conventionality is not enough to confirm the linguistic status of a point. We know that the emblematic gestures (or symbolic gestures) of hearing, speaking people are conventional within particular communities: for example, the horns handshape (🤘, first and little fingers extended, other fisted) has very different meanings in different communities. In Texas, it represents the mascot (a longhorn steer) of The University of Texas at Austin; in Italy this same handshape is associated with marital infidelity. George W. Bush and Silvio Berlusconi were each photographed using the horns gesture when each was still in office, but for these two politicians the conventional meanings of this gesture are quite distinct.

Points to self show interesting crosslinguistic variation: although most established signed languages of the deaf use a point to the center of the signer's chest when the signer is referring to him-/herself, three historically-related signed languages of East Asia—specifically, Japanese, Korean, and Taiwan Sign Languages—also allow a point to the nose. In Korean Sign Language there are three possible first-person singular forms: a flat hand (a B-hand) at the chest as well as two index-finger forms, one at the chest and the other at the nose (Jhang, 2011). The form articulated at the nose is used in restricted contexts. Two auxiliary signed languages used by hearing populations also use a point to the nose (or face) for first-person points; those

languages are Plains Indian Sign Language (Farnell, 1995) and an Aboriginal sign language of Australia (Kendon, 1988). As Cormier, Schembri, & Woll (2011) have recently observed, gestural points to the self also show crosscultural differences, such that a Japanese hearing individual may indicate self-reference by pointing to his/her nose (Poyatos, 2002); this suggested to Cormier et al. that culture (and perhaps not grammar) has a role in determining the form that reference to the self takes in signed languages. Somewhat differently, we would speculate that seeds of the first-person category in the grammar of signed languages may be found in gestural differences in how one refers to oneself versus others.[4]

Just how well do pointing signs point? We hinted before that ASL's first-person plural pronouns present strong evidence of being conventionalized. Using evidence from dictionaries and films, Frishberg (1975) traced historical change in the form of ASL signs. She found that the sign WE was once "a series of separate thrusts, sometimes as many as five or six, first pointing at one's own chest, than at three or four other persons (real or imagined) and finally at the chest again" (p. 50); clearly this sign was a pointing sign. The modern sign WE is illustrated in Figure 3. Now it touches one side of the chest, then the other. The ASL sign OUR has a B-hand (B, similar to the flat hand of other possessive forms, but with the thumb in); by means of a twisting movement of the forearm, the hand arcs from thumb contact on the ipsilateral side of the chest to little-finger contact on the other side of the chest. These signs have become deindexicalized; that is, despite their hypothesized origins in pointing signs, WE and OUR no longer point clearly, if at all. At best, WE points to the signer (but does not point to any other individuals who might be referents of this sign). Interestingly, the signs WE and OUR do not generally contact the location at the center of the chest that is contacted by their respective singular counterparts ME and MINE. Evidence such as this led Meier (1990) to conclude that in its person system ASL has a first-person plural category.

Cormier (2007; Cormier et al. 2011) has suggested that plural pronominal signs generally point less well—less precisely—than singulars in both ASL and

[4] Articulatory constraints on gestural pointing may also set the stage for a linguistic contrast between first and non-first person. In manual pointing, gaze cannot support pointing reference to oneself, whereas it can support pointing reference to other persons or locations. In lip pointing (Enfield, 2001; Sherzer, 1973), reference to oneself may be difficult or impossible. Such constraints may encourage the development of distinct gestures for first-person reference.

British Sign Language (BSL). She also observed some subtle differences between ASL and BSL, such that certain so-called "exclusive" forms pointed better in BSL. In general, number marking may lead plurals to point less well than singulars in signed languages. However, as Cormier et al. have also observed, signed languages vary in whether or not they have first-person plurals akin to ASL WE.

Figure 3. The ASL sign WE.

Phonological compositionality? Words are built of meaningless sublexical units. The meaningful English word *cat* is formed from three meaningless phonemes. The words *cat* and *pat* are a so-called "minimal pair" that differ, in this instance, in just their first phonemes. The words *cat*, *act*, and *tack* differ only in the ordering of the constituent phonemes. This phenomenon in spoken languages of meaningful units being built of meaningless units of form is called "duality of patterning" (Hockett, 1960). Signed languages also exhibit duality of patterning; for example the ASL signs APPLE and ONION both have an X-handshape (X) and both have a twisting movement of the forearm. They differ only in place of articulation—specifically, the corner of the eye for ONION, as opposed to the cheek for APPLE. The handshape, movement, and places of articulation exhibited by these two ASL signs are meaningless sublexical units within these signs. Data on slips of the hand and slips of the tongue constitute strong evidence for the role of such sublexical structure within signs and words (Klima & Bellugi, 1979).

What about pointing signs? Do they also exhibit duality of patterning? The first-person point ME in ASL has values for handshape, place, and movement

that are shared by lexical signs. The sign SICK shows the same movement to contact on the body that is shown by ME. The signs SORRY and HAPPY have the same value for place of articulation (the middle of the upper chest) as the sign ME. And the sign CANDY has an extended index finger for its handshape, just as does ME.

Points to non-addressed third-person referents present a problem. If we assume that the addressee stands opposite the signer in a typical conversation, then non-addressed participants may occupy varying locations to the left or right of the sagittal plane that bisects the signer at the midline. In the set of lexical, nonpointing signs, the distinction between a sign produced to the left of the midline, versus a sign produced to the right is not phonologically contrastive in ASL or in any other sign language of which we are aware. But imagine a conversation in which Mary is the addressee (and is located opposite the signer) and in which John (on the signer's left) and Bill (on the signer's right) are non-addressed participants. The contrast between a point to the left versus one to the right is very significant, inasmuch as it indicates reference to John versus Bill. Thus, left-right distinctions are crucial for the production and interpretation of pointing signs, whereas they do not differentiate lexical signs. Pointing signs draw from a different set of articulatory distinctions than do lexical signs. Moreover, the precise locations on the left or right to which these signs point are, in the case of reference to a nonaddressed participant in a conversation, determined by that individual's physical location. In this sense, points to nonaddressed participants do not fully exhibit duality of patterning, inasmuch as the locations to which these signs point cannot be enumerated in a listing of sublexical phonological units (Rathmann & Mathur, 2002). Given that addressees do not occupy fixed locations vis-à-vis the signer, points to addressees present the same problem; see Aronoff & Padden (2011) for recent discussion.[5]

Our conclusion is this: first-person points, but not non-first points, can be specified entirely in terms of the phonological units that form lexical signs. First person points, but not non-first points, fully exhibit duality of patterning. In contrast the locations in space of non-first person points appear to be gestural inasmuch as the direction of pointing is—when the signer is referring

[5] If we were to assume a fixed location for the addressee that is opposite the signer, then we might be able to maintain duality of patterning for second-person singular points. However this assumption seems unwarranted, given the varying arrangements that are possible for signers, e.g. seated side-by-side while driving.

to an individual who is present at the conversation—determined by the referent's physical location in the environment.

Although the singular first-person pronoun ME can be fully specified phonologically, its location at the center of the signer's chest is nonetheless a location that American hearing nonsigners would also use when pointing to themselves. However there are still other first-person signs, presumably derived from pointing signs, that must be described using the same phonological features that are used in the description of non-pointing signs. For example, the first-person plural signs WE and OUR first contact one side of the chest, then the other; again see Figure 3. This sequence of places of articulation is exhibited by a variety of lexical signs including MEMBER and COMMITTEE. The first-person object forms of certain verbs are idiosyncratic and must be listed in the dictionary. The citation form of CONVINCE is produced in the signing space in front of the signer without contact on the body; however, as shown in Figure 4, this verb's first-person object form makes contact at the neck (Meier, 1990; Liddell, 2003; Lillo-Martin & Meier, 2011). This location is phonologically contrastive in ASL. There are morphologically simplex, lexical signs that exhibit this same location: for example, BROKE ['penniless'], ACCENT, and VAMPIRE.[6] We conclude that first-person forms in ASL are fully describable phonologically; nonfirst person forms are phonological specified in part, and gestural in part.

(a)

(b)

[6] We thank Lynn Hou for discussion of this point.

Figure 4: Two forms of the ASL verb CONVINCE: (a) CONVINCE-him and (b) CONVINCE-me.

Grammatically constrained distributions? Although the forms of simple, nonpossessive pronouns often show little evidence of being conventionalized, the distribution of such signs seems to be constrained in language-particular and language-universal ways. Within linguistics, it has long been recognized that pronouns have restricted interpretations in particular environments, and various proposals have been made to capture these generalizations (from Lees & Klima, 1963 to the Binding theory of Chomsky, 1981 and many others). While there are certain language-particular concerns, some of these restrictions can be stated as universals—at least, across spoken languages. Recently, researchers have addressed whether sign languages also adhere to the same constraints, and the answer seems to be yes, although language-specific and possibly modality-specific differences do exist (cf. Sandler & Lillo-Martin, 2006; Schlenker & Mathur, 2010).

Other grammatical constraints on pointing signs can also be found. For example, Padden (1983) proposed that sentence-final pointing signs found in ASL are subject-pronoun copies, which can point to a subject within the same sentence, even reaching across an embedded clause, but cannot point back across a coordinate clause. Bos (1995) found a similar phenomenon in the Sign Language of the Netherlands (SLN).

A fundamental typological difference amongst signed languages concerns whether a given signed language has auxiliary-like elements that point to locations associated with the subject and object of a transitive verb, as mentioned in an earlier section. In each language in which such auxiliary signs are found, different constraints apply. For example, some languages (e.g. SLN) permit the auxiliary to co-occur with verbs that are marked for agreement, while other languages do not (e.g. Brazilian Sign Language—Libras); and some sign languages (Libras) place the auxiliary before the verb, while others (SLN) have it after the verb (Bos, 1994; Quadros & Lillo-Martin, 2010). These language-specific grammatical requirements highlight the current linguistic status of these pointing signs, despite what may be their gestural origins.

What grammatical distinctions are marked? When we look across signed languages, we see evidence that pointing signs mark an array of grammatical distinctions similar to those marked by pronouns in spoken languages. We have seen that, in some signed languages, there are distinctive possessive pointing signs. Pointing signs also mark number distinctions and, in Japanese

Sign Language, they sometimes mark the biological gender of nonpresent referents (by means of distinctive handshapes on the nondominant hand). Many (but by no means all) spoken languages mark case distinctions in their pronominal systems (e.g. English *he/ him* or *I/ me*). There is little evidence for case within the pointing signs beyond the distinctive marking of the possessor.

Pointing signs also mark person categories, such as first-person singular and plural, but may not mark the full set of person categories typically distinguished by pronouns in spoken languages. In particular, evidence for distinct grammatical categories of second and third person is weak. Meier (1990) argued that ASL pronouns show a grammatical distinction between first and non-first persons (and between first-person singular and plural), but no grammatical distinction between second and third persons; this analysis has been adopted for a number of other languages including Taiwan (Smith, 1990) and Danish Sign Languages (Engberg-Pedersen, 1993).[7] Differences in the person systems of signed and spoken languages may reflect the differing resources available to the two language modalities. In particular, personal pronouns in signed languages exploit the spatial differentiation available through pointing, whereas the personal pronouns of spoken languages can be supplemented by pointing only when speaker and addressee are in sight of each other.[8]

Pointing Over Time

The human capacities to point and to gesture are important contributors to the emergence of signed languages. These capacities are a foundation for the development of home sign systems by isolated deaf children born into hearing families; their early two-gesture strings combine points and motor-iconic gestures (Goldin-Meadow & Mylander, 1990). Some ASL signs, such as the modal verb CAN, seem to have their roots in nonlinguistic gesture (Janzen &

[7] McBurney (2002) questions whether person is marked at all in signed languages. Cormier et al. (2011) accept the claim that there are distinctive first-person plural forms in some (but not all) signed languages, but question the existence of first-person singulars.

[8] On some analyses (e.g. Berenz, 2002), patterns in how signers gaze to the addressee versus non-addressed participants support the claim that there is a grammatical distinction between second- and third-person pronouns in ASL and other signed languages. For recent discussion, see Lillo-Martin & Meier (2011) and Wilbur (2012). To the best of our knowledge, there is no evidence for handshape or movement differences between points to addressees and points to non-addressed participants that would support the claim that there are distinct second- and third-person categories in a signed languages.

Shafer, 2002). We now ask the following: With historical change, do signed languages move away from their presumed gestural origins so that mature signed language point less than emergent systems? We've seen some evidence for this historical trend in the emergence of ASL's first-person plural sign WE, which early in the history of ASL may have consisted of a series of separate pointing gestures (Frishberg, 1975). Over time this sign apparently became more conventionalized, less indexic, and more compositional phonologically.

Grammaticization of pointing signs within emergent sign languages. Many signed languages are young languages. Linguists have documented the emergence of such languages in communities that have no prior history of a local signed language. Surprisingly, systems of pointing signs take time to develop in emergent signed languages, even though these pointing signs arguably contain gestural elements that are available to signers and nonsigners alike. As Meir, Sandler, Padden, & Aronoff (2010) discuss, pointing verbs—that is, directional verbs—may even be absent from some emergent signed languages. One such sign language is Al-Sayid Bedouin Sign Language, a language used within a Bedouin community that has a very high incidence of recessive deafness.

Nicaraguan Sign Language is a language that has emerged since just 1977. In that year, a residential school for deaf children was established in Managua; with the growth of the school, a deaf community formed in Managua (Polich, 2005). Senghas & Coppola (2001) examined the signing of members of the first and second cohorts of deaf students to enter the residential school. Signers were asked to view a short cartoon and then tell another deaf signer what had happened in that cartoon. One measure that Senghas & Coppola computed was the number of spatial modulations per verb; when a verb was produced in a "nonneutral location" (that is, when the verb was not "produced neutrally in a central location in front of the chest"), the verb was considered to be spatially modulated (p. 324). In the terminology that we are using in this paper, such verbs pointed to, or agreed with, those nonneutral spatial locations. Given that the subjects were describing a cartoon, these locations were likely empty locations in space; that is, the verbs were not pointing to people or objects in the immediate environment. The key finding is this: signers in the second cohort to enter Managua's school for the deaf, especially those second-cohort signers who were exposed to the emerging sign language before age 10, used more spatial modulations per verb than did first-cohort

signers. Second cohort signers also used spatial modulations more coherently, that is, for purposes of shared reference across utterances within the discourse.

More recently, Senghas & Coppola (2010) have examined the usage of index finger points in three successive cohorts of signers to enter the Managua school. They found that the usage of points to locations held steady across cohorts, whereas the usage of points to people and objects ("nominal points") increased. Individuals in later cohorts were more likely to use nominal points as the arguments of verbs. The changing usage of nominal points and of spatial modulations on verbs suggests that, across cohorts, pointing devices are becoming systematized in Nicaraguan Sign Language. The fact that it was signers who had been exposed to NSL before age 10 who used more spatial modulations on verbs, who were more likely to use those spatial modulations for purposes of shared reference, and who (on a third measure) were also most fluent suggests that children have been systematizing the language. However, systematization of pointing devices does not imply that pointing was used less frequently. Second and third cohort signers used nominal points more frequently than did first cohort signers. Second cohort signers used more spatial modulations per verb than did first-cohort signers.

Across generations of Danish Sign Language (Engberg-Pedersen, 1993), verbs have also come to point more. For older Danish signers, verbs agreed only with non-first person locations (i.e. locations associated with the addressee and with any non-addressed participants in a conversation). In younger signers, however, the movement direction of verbs may now reverse to agree with first-person objects.

Similar cross-generational change has recently been documented for Israeli Sign Language (ISL; I. Meir, 2012), a language that is only about 75 years old. Meir elicited ISL verbs from three generations of signers; the crucial verbs have two animate arguments (e.g. GIVE, TAKE, or THROW). In the oldest generation of signers, these verbs tended to have fixed shapes that did not allow them to point to any locations in space. On Meir's analysis, the final location of a verb like GIVE then became spatially modifiable; in her wording "the verb's 'loose' end can be directed to any location associated with an argument in the signing plane" (p. 148). For signers in this stage of the development of ISL, the verb GIVE can agree with the location of one non-first person argument; that argument must be associated with the recipient (the indirect object). Finally, in third-generation signers, the initial location of the verb GIVE is no longer anchored to the body; the verb can now move to a first-

person object location on the body (if the signer herself is the recipient); it can also move from a location associated with the subject (the donor) to a location associated with the indirect object (the recipient).

What seems to have happened in ISL is this: phonologically-fixed verbs of transference have been reanalyzed across generations of signers. With this reanalysis, the endpoints of such verbs have become available to mark the arguments of those verbs; the outcome of that reanalysis is, on Meir's view, a morphosyntactic process of verb agreement, much like verb agreement in spoken languages. In ISL (and other signed languages), a verb's arguments are indicated by movement to, or away, from locations associated with those arguments. The indication of these locations is like pointing, on our view, and thus may have a gestural aspect, particularly in that it may be impossible to enumerate those locations in the phonology of these languages. However, the fact that these verbs can point to their arguments reflects grammatical constraints that have emerged only over time. A further conclusion is that the emergence of first-person marking on these verbs—specifically, marking of first-person objects—is particularly late.

Meir's discussion of the emergence of agreement in ISL differs from the proposal made by Pfau & Steinbach (2006), who suggest that agreement markers in sign languages emerge from the use of pointing in personal pronouns. If a point to a location precedes or follows a verb as an independent pronominal argument, it is intuitive to think that the independent pronoun may be the historical antecedent for the verb's modification, and this has happened many times in the history of spoken languages. Meir's proposal focuses on the changing properties of the verb itself rather than on a grammaticization path through pronouns. Comparing the two ideas in further detail, including their differing predictions (suggested in Meier & Lillo-Martin, 2012) for matters such as the different classes of verbs which show agreement, may lead to a better understanding of the process by which gestural elements become linguistic, and the complex interplay between language and gesture in the points of signing.

Loan signs in established sign languages. Just like spoken languages, established sign languages such as ASL have various mechanisms for expanding their vocabularies. Those mechanisms include compounding and derivational morphology (Klima & Bellugi, 1979, Supalla & Newport, 1978). Another mechanism is borrowing. Signed languages borrow from other signed languages; for example, ASL has recently borrowed the LIS sign for Rome.

Signed languages also borrow from their local written language. Spoken languages do the same thing; acronyms in English are borrowings from the writing system. Examples include *snafu* ('situation normal all f–-ed up'), *radar*, and the names of many governmental or international agencies (e.g. NATO, UNICEF, and NASA, which are pronounced as words, whereas the CIA, the FBI, and UCLA are referred to by saying the first letters of their full names).

ASL has borrowed from the fingerspelling representation of English written words. Interestingly the sign NO is a lexicalization of the fingerspelling sequence N-O. Neither fingerspelled letter is fully retained in the sign NO; instead NO displays phonological properties that are entirely consistent with those of other signs whose origins do not lie in the fingerspelling system (e.g. it has the same kind of hand-internal movement as the signs BIRD or DUCK). Crucially, a verb has been derived from NO; the sign SAY-NO-TO is a directional verb that can indicate its subject and object. Thus, the fingerspelling loan sign NO has been "nativized" (Padden, 1998) as a directional verb SAY-NO-TO that displays the same morphosyntactic properties as directional verbs that have no historical link to written English. Other fingerspelling loans that have undergone this nativization process include a sign FEEDBACK (F-B) that has been nativized as a directional verb meaning 'provide feedback to someone.'

The conclusion is that even established sign languages can add new signs to the class of verbs that indicate locations associated with their arguments; surprisingly those signs can have their origins in the writing system of the larger culture surrounding ASL. The same phenomenon has been observed in other signed languages from countries that use very different orthographies, such as Taiwan Sign Language (Chen, 2007).

Conclusion: A Complex Interaction Between Gesture and Sign

Pointing signs exploit the rich spatial resources available in the visual-gestural modality. The origins of these signs may lie, in part, in pointing gestures (or, in the case of directional verbs, in action gestures–Casey, 2003) that are used by signers and nonsigners. We have reviewed a variety of factors that over time may make pointing signs less like gestural pointing. These factors include the grammatical marking of semantic distinctions such as plurality and possession and the lexicalization of first-person plural signs.

In contrast there are other factors leading to signs that are more like pointing, or to sign systems that involve more pointing. These include the

systematization of space in emergent signed languages; the emergence of first-person object forms of directional verbs; the nativization of loan signs; and the emergence of auxiliary signs (instead of a reliance on syntactic mechanisms of marking argument structure).

The result is that there is a two-way street between "linguistic" and "gestural" elements in mature signed languages (Rathmann, Mathur, & Meier, 2003). On this account, the relationship between signed languages and gesture is not simple. Although some factors may lead signed languages to point less over time, other factors enhance the role of pointing. Crucially, the emergence of gestural elements within signed languages is not necessarily immediate. We've seen that, even though directional verbs point to locations associated with their arguments, these verbs emerge over generations (Israeli Sign Language) or cohorts (Nicaraguan Sign Language). First-person object verb forms appear to be a particularly late development, as suggested by evidence from Israeli and from Danish Sign Languages. Even though directional verbs display gestural elements—specifically, the indication of locations associated with the subject and object—there appears to be a considerable lag between the emergence of a signed language and the emergence of the system of a directional verbs within that language.

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REFERENCES

Aronoff, Mark & Padden, C. (2011). Sign language verb agreement and the ontology of morphosyntactic categories. *Theoretical Linguistics* 37: 143–151.

Berenz, N. (2002). Insights into person deixis. *Sign Language and Linguistics* 5: 203–227.

Bos, H. (1994). An auxiliary in Sign Language of the Netherlands. In I. Ahlgren, B. Bergman & M. Brennan (eds.), *Perspectives on sign language structure: Papers from the Fifth International Symposium on Sign Language Research*, 37–53. University of Durham: International Sign Linguistics Association.

Bos, H. (1995). Pronoun copy in Sign Language of the Netherlands. In H. Bos & T. Schermer (eds.), *Sign language research 1994: Proceedings of the Fourth European Congress on Sign Language Research,* 121–147. Hamburg: Signum.

Casey, S. (2003). *"Agreement" in gestures and signed languages: The use of directionality to indicate referents involved in actions*. Ph.D. dissertation, University of California, San Diego.

Chen, H. (2007). *Lexical borrowing in Taiwan Sign Language – Focus on Chinese character signs*. M.A. thesis, University of Texas at Austin.

Chomsky, N. (1981). *Lectures in government and binding*. Dordrecht: Foris.

Cormier, K. (2007). Do all pronouns point? Indexicality of first person plural pronouns in BSL and ASL. In P. Perniss, R. Pfau, & M. Steinbach (eds.), *Visible variation: Comparative studies on sign language structure*, 63–101. Berlin: Mouton de Gruyter.

Cormier, K. (2012). Pronouns. In R. Pfau, M. Steinbach, & B. Woll (eds.), *Sign language: An international handbook*, 227–244. Berlin: Mouton de Gruyter.

Cormier, K. Schembri, A. & Woll B. (2011). Do sign languages lack pronouns? Unpublished manuscript, Centre for Deafness, Cognition, and Language, University College London.

Enfield, N. J. (2001). 'Lip–pointing': A discussion of form and function with reference to data from Laos. *Gesture* 1: 185–212.

Engberg–Pedersen, E. (1993). *Space in Danish Sign Language*. Hamburg: Signum–Verlag.

Farnell, B. (1995). *Do you see what I mean? Plains Indian Sign Talk and the embodiment of action*. Austin: University of Texas Press.

Frishberg, N. (1975). Arbitrariness and Iconicity: Historical change in American Sign Language. *Language* 51: 696–719.

Goldin–Meadow, S. & Mylander, C. (1990). Beyond the input given: The child's role in the acquisition of language. *Language* 66: 323–355.

Hockett, C. (1960). The origin of speech. *Scientific American* 203: 88–96.

Janzen, T. & Shaffer, B. (2002). Gesture as the substrate in the process of ASL grammaticization. In R. P. Meier, K. Cormier, & D. Quinto–Pozos, (eds.), *Modality and structure in signed and spoken languages*, 199–223. Cambridge: Cambridge University Press.

Jhang, S. (2011). Personal pronouns and reflexives in Korean Sign Language. *Journal of Language Sciences* 18: 87–111.

Kendon, A. (1988). *Sign languages of Aboriginal Australia: Cultural, semiotic and communicative perspectives*. Cambridge: Cambridge University Press.

Klima, E. S. & Bellugi, U. (1979). *The signs of language*. Cambridge, MA: Harvard University Press.

Koulidobrova, E. (2012). *When the quiet surfaces: 'Transfer' of argument omission in the speech of ASL–English bilinguals*. Ph.D. Dissertation, University of Connecticut.

Lees, R. B. & Klima, E. S. (1963). Rules for English pronominalization. *Language* 39: 17–28.

Liddell, S. K. (2003). *Grammar, gesture, and meaning in American Sign Language*. Cambridge: Cambridge University Press.

Lillo–Martin, D. & Klima, E. S. (1990). Pointing out differences: ASL pronouns in syntactic theory. In S. D. Fischer & P. Siple (eds.), *Theoretical issues in sign language research. Volume 1: Linguistics*, 191–210. Chicago: University of Chicago Press.

Lillo–Martin, D. & Meier, R, P. (2011). On the linguistic status of 'agreement' in sign languages. *Theoretical Linguistics* 37: 95–141.

MacLaughlin, D. (1997). *The structure of determiner phrases: Evidence from American Sign Language*. Ph.D. dissertation, Boston University.

McBurney, S. L. (2002). Pronominal reference in signed and spoken language: Are grammatical categories modality–dependent? In R. P. Meier, K. Cormier, & D. Quinto–Pozos (eds.), *Modality and structure in signed and spoken languages*, 329–369. Cambridge: Cambridge University Press.

Meier, R. P. (1990). Person deixis in American Sign Language. In S. D. Fischer & P. Siple (eds.), *Theoretical issues in sign language research. Volume 1: Linguistics*, 175–190. Chicago: University of Chicago Press.

Meier, R. P. & Lillo–Martin, D. (2010). Does spatial make it special? On the grammar of pointing signs in American Sign Language. In D. B. Gerdts, J. C. Moore, & M. Polinsky (eds.), *Hypothesis A/Hypothesis B: Linguistic explorations in honor of David M. Perlmutter*, 345–360. Cambridge, MA: MIT Press.

Meier, R. P. & Lillo–Martin, D, (2012). Response: The apparent reorganization of gesture in the evoluion of verb agreement in signed languages. *Theoretical Linguistics* 38: 153–157.

Meir, I. (2012). The evolution of verb classes and verb agreement in signed languages. *Theoretical Linguistic*s, 38, 145–152.

Meir, I. Sandler, W. Padden, C. & Aronoff, M. (2010). Emerging sign languages. In M. Marschark & P. E. Spencer (eds.), *The Oxford handbook of deaf studies, language, and education*, *Volume 2*, 267–280. New York: Oxford University Press.

Okrent, A. (2002). A modality–free notion of gesture and how it can help us with the morpheme vs. gesture question in sign language linguistics (Or at least give us some criteria to work with). In Richard P. Meier, K. Cormier. & D. Quinto–Pozos (eds.), *Modality and structure in signed and spoken languages*, 175–198. Cambridge: Cambridge University Press.

Padden, C. A. (1983). *Interaction of morphology and syntax in American Sign Language*. Ph.D. dissertation, University of California, San Diego. (Also published 1988 in the series Outstanding Dissertations in Linguistics. New York: Garland).

Padden, C. A. (1998). The ASL lexicon. *Sign Language and Linguistics* 1: 39–60.

Perlmutter, D. M. (1991). The language of the deaf. *New York Review of Books*, March 28, 65–72.

Pfau, R. (2011). A point well taken: On the typology and diachrony of pointing. In Gaurav Mathur & Donna Jo Napoli (eds.), *Deaf around the world: The Impact of language*, 144–163. Oxford University Press.

Pfau, Roland & Markus Steinbach 2006. Modality–independent and modality–specific aspects of grammaticalization in sign languages. *Linguistics in Potsdam* 24: 3–98. Available at http://www.ling.uni–potsdam.de/lip/

Pizzio, A. L. Rezende, P. & Muller de Quadros, R. (2009). *Língua Brasileira de Sinais V.* Florianopolis, Brazil: Universidade Federal de Santa Catarina.

Polich, L. (2005). *The emergence of the deaf community in Nicaragua: "With sign language you can learn so much."* Washington, DC: Gallaudet University Press.

Poyatos, F. (2002). *Nonverbal communication across disciplines. Volume 1: Culture, sensory interaction, speech, conversation.* Amsterdam: John Benjamins.

Quadros, R. & Lillo–Martin, D. (2010). Clause structure. In Diane Brentari (ed.), *Sign languages: A Cambridge language survey.* Cambridge: Cambridge University Press.

Quadros, R. & Quer, J. (2008). Back to back(wards) and moving on: On agreement, auxiliaries and verb classes in sign languages. In R. Müller de Quadros (ed.), *Sign languages: Spinning and unraveling the past, present and future*, 530–551. Petrópolis, Brazil: Editora Arara Azul.

Radutzky, E. (1992). *Dizionario bilingue elementare della Lingua Italiani dei Segni.* Rome: Ediziona Kappa.

Rathmann, C. & Mathur, G. (2002). Is verb agreement the same cross–modally? In R. P. Meier, K. Cormier & D. Quinto–Pozos (eds.), *Modality and structure in signed and spoken languages*, 370–404. Cambridge: Cambridge University Press.

Rathmann, C. Mathur, G. & Meier, R. P. (2003). From gesture to verb agreement in signed languages. In J. Streek (ed.), *Proceedings of the International Society for Gesture Studies.* University of Texas at Austin, Austin, TX.

Sandler, W. & Lillo–Martin, D. (2006). *Sign language and linguistic universals.* Cambridge: Cambridge University Press.

Schlenker, P. & Mathur, G. (2010). Binding Theory in ASL. Paper presented at the Tenth International Conference on Theoretical Issues in Sign Language Research (TISLR), Purdue University.

Senghas, A. & Coppola, M. (2010). Deixis in an emerging sign language. In D. Brentari (ed.), *Sign languages*, 543–569. Cambridge: Cambridge University Press.

Sherzer, J. (1973). Verbal and nonverbal deixis: The pointed lip gesture among the San Blas Cuna. *Language in Society* 2: 117–131.

Supalla, T. & Newport, E. (1978). How many seats in a chair? The derivation of nouns and verbs in American Sign Language. In P. Siple (ed.), *Understanding language through sign language research*, 91–132. New York: Academic Press.

Wilbur, R. (2012). The point of agreement. Presented at the conference on Formal and Experimental Advances in Sign Language Theory, June 1, 2012, Warsaw.

Zimmer, J. & Patschke, C. G. (1990). A class of determiners in ASL. In C. Lucas (ed.), *Sign language research: Theoretical issues*, 201–210. Washington, DC: Gallaudet University Press.