

RESEARCH

The morphology of first-person object forms of directional verbs in ASL

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There is an ongoing debate about whether there exists a grammatical distinction between first-person and non-first person in signed languages, namely American Sign Language (ASL). The debate has been based largely on different analyses of pointing signs but minimally on the person-marking of directional verbs for object. We present an analysis of 95 unique first-person object forms of directional verbs from a combination of elicited and naturalistic data. We test the hypothesis that there is a default first-person object location at the center of the chest. Although we report evidence consistent with that hypothesis, we also find that some first-person verb forms are irregular with respect to the following dimensions of morphological properties in which they are lexically specified for: (1) final place of articulation; (2) height; (3) facing; and (4) body contact. Furthermore, a handful of directional verbs do not have first-person object forms. We interpret the findings to constitute evidence for the distinction between first-person and non-first person in ASL.

Keywords: person; verb agreement; pronoun; object marking; American Sign Language

1 Introduction

The notion of grammatical person has been widely explored in linguistics. Person encodes the discourse roles of the speaker of an utterance as first person, the addressee as second person, and a non-addressed individual as third person. Recent typological studies of spoken languages reveal variation in the morphological marking of person, with the possibilities including independent pronouns, clitics, affixes, and zero forms (Cysouw 2003; Bhat 2004). In most spoken languages, person markers do not signify person alone but also mark other grammatical categories such as number, gender, animacy, formality, and case, and are organized in inflectional paradigms (Siewierska 2004).

Notwithstanding the diversity of morphological shapes that mark person in spoken languages, the representation of person as a grammatical category and the three-person distinction are universal, or nearly so. Yet the universality of person has not gone uncontested, as some scholars question whether all languages, including signed languages, contain personal pronouns (Evans & Levinson 2009; Johnston 2013a). An ongoing debate among sign linguists revolves around the fundamental question of whether signed languages have true pronouns that mark person and that make a formal distinction between first, second, and third person.

Signed languages utilize deictic pointing signs for pronominal reference (and for other functions such as locatives) within the signing space. The term *signing space* refers to the immediate physical space that surrounds the signer, including the signer herself (see Perniss 2012 for a detailed review). Those pointing signs resemble non-signers' pointing

gestures (Kita 2003; Kendon 2004; Cormier et al. 2013; Johnston 2013a; b; Meier & Lillo-Martin 2013). In American Sign Language (hereafter, ASL) and most other natural signed languages, to mark self-reference a signer points to herself at the center of her torso with an extended index finger, as shown in Figure 1. For marking referents other than the signer, she points to the real-world locations of an individual who is physically present in a conversation, as shown in Figure 2 for a non-addressed participant.

For marking non-present referents, the signer typically may pick an arbitrary location in the signing space, in Figure 3. These referents may be imagined to be present in the space (Liddell 2003; de Beuzeville et al. 2009; Cormier et al. 2015). The signer associates the location with a referent by identifying the referent with a nominal and associating the nominal with the location (Padden 1988; Rinfret 2009). Such arbitrary locations have been traditionally known as referential loci, or R-loci. Once the R-locus is established for a particular referent, that locus can be used subsequently for reference-tracking, similar



Figure 1: 1st person pronoun.



Figure 2: Non-1st person pronoun, present referent (N.B. this figure is a composite of two photos).



Figure 3: Non-1st person pronoun, non-present referent.

to pronominal reference in spoken languages (Fischer & Gough 1978; Padden 1988; Lillo-Martin & Klima 1990; Meir 2002). The term *R-locus* is reserved for a spatial location used in this way, which is distinct from the term *R-index*, a formal device used for indicating reference within and across sentences (Lillo-Martin & Klima 1990).

Signed languages are notable for the morphological uniformity of their pointing signs for pronominal reference, in striking contrast to the morphological diversity of pronouns and demonstratives in spoken languages (McBurney 2002). Prior analyses of person in ASL and other signed languages have reached differing conclusions: ASL has been argued to have (1) a two-person system distinguishing first- and non-first person; 2) a three-person system; or (3) no person contrasts, at least in the singular. Those prior analyses have been largely based on the analysis of pointing signs (and some comparisons to pointing gestures), but only minimally on an analysis of directional verbs. We argue here that a detailed discussion of directional verbs can contribute to our understanding of person in ASL and some other signed languages.

Early analyses of ASL adopted three-person systems akin to those of spoken languages (Fischer & Gough 1978; Klima & Bellugi 1979; Lillo-Martin 1986; Padden 1988). However, Meier (1990) proposed a two-way person system, positing that ASL pronouns and directional verbs make a first person versus non-first person distinction, but not a second versus third person distinction. He argued that, in ASL, first person is specified by the signer's pointing to herself on the chest, contacting it, and that this location is phonologically-specified. This sign need not refer to the signer herself and can instead refer to a quoted individual, a common phenomenon in signed languages known variously as *role-playing*, *role-shifting*, or *referential shift* (see Lillo-Martin 2012 for a review). Alibašić Ciciliani & Wilbur (2006) also argue that in Croatian Sign Language (HZJ), the usage of self-points for referential shift constitutes evidence for first-person.

Meier (1990) also observed that ASL has idiosyncratic first-person plural pronominal forms glossed as WE, OUR, and OURSELVES.¹ Those forms can be seen as pointing to the signer, twice in sequence on her upper torso, beginning either ipsilaterally or contralaterally to the dominant hand. However, these forms do not point to the locations associated with the other individuals who are included in the set they denote, rendering them less

¹ Dictionary forms for WE and OUR can be found at: <https://www.signingsavvy.com>. For OURSELVES, consult: <https://www.handspeak.com>.

indexical than non-first person plural forms. Meier further argued that there was no compelling evidence—either from the use of space or from eye gaze—for a morphological distinction between second and third person. This argument has received support from recent eye-tracking analyses (Thompson et al. 2013). In the signed language, Kata Kolok (KK), used in a Balinese village, de Vos (2012) found that eye gaze was not a reliable cue to distinguish second- from third-person referents.

Some scholars have argued for the three-person system analysis based on the usage of non-manual markers for distinguishing persons. Alibašić Ciciliani & Wilbur (2006) argue that HZJ distinguishes second- from third-person on the basis of the physical alignment of the signer's eye gaze, head, and hand(s): when a signer points to the addressee, these features are in conjunction along the midline of the signer's body, but when the signer points to a non-addressee, these features are in disjunction. Berenz (2002) has made similar arguments for Brazilian Sign Language (Libras). We will not address the issue here of whether there is a distinction between second- and third-person in ASL or other signed languages.

Still other scholars have argued that signed languages lack person, at least in the number category of singular. This perspective posits that pointing signs do not function as pronouns analogous to those in spoken languages, thereby suggesting that the pointing signs do not mark grammatical person at all (Ahlgren 1990; McBurney 2002; Cormier et al. 2013; Johnston 2013a). Johnston (2013b) states the pointing signs for self, addressee, and non-addressee do not constitute a linguistic encoding of three-person pronominal system, as they are not fundamentally different from the points used in co-speech gestures. Cormier et al. (2013) do not find compelling evidence for a distinction between a first-person singular pronoun and a non-first person counterpart for any signed language described in the literature. However, they propose “the lexicalised first person plural pronominal sign in sign languages such as BSL and ASL constitutes good evidence for a distinction between first and non-first person in the plural” (238). Here we revisit arguments for a first-person singular category in ASL. Meier (1990) noted that one verb, CONVINCING, has an idiosyncratic first-person object form that must be listed in the ASL dictionary. We argue here that a detailed discussion of directional verbs can contribute to our understanding of person in ASL and some other signed languages.

Directional verbs are a class of transfer verbs that prototypically exhibit path movement from one location to another in the signing space. Figure 4 depicts a classic example of a directional verb, glossed as 3-GIVE-1, modified for a non-first person subject and a first-person object.² In Figure 4, the modification of the verb denotes an event of transfer from one referent to another referent by “pointing” to the spatial locations associated with these referents. The referents fulfill two core arguments of GIVE; those arguments encode the thematic roles of agent and recipient, or—on one analysis—source and goal (Meier 1998b; 2002). These arguments can also be analyzed as subject and object. On some accounts (e.g. Rathmann & Mathur 2002), these arguments must be animate. Directional verbs are either monotransitive or ditransitive, but not intransitive. Subject marking can be omitted

² Following the conventions of sign language notation, manual signs in ASL are represented by English glosses, which are shown here in small capitals. The reader should not assume that the part of speech of the English gloss extends to the ASL sign being glossed. Other conventions that we use are as follows: (1) A number preceding a gloss indicates the subject of a regular verb and a number following the gloss indicates its object; the opposite is true for backwards verbs; (2) Fingerspelled items are indicated by the pound symbol # at the beginning of the word. (3) A gloss that ends with BASE typically represents a two-handed variant of a one-handed sign – for example, SEND is a one-handed sign whereas SEND + BASE is a two-handed sign that closely resembles SEND but with the addition of a non-dominant base hand; and (4) A gloss that ends with “+ ENTITY” (ENTITY) means the sign includes a human entity classifier, which takes the form of an upright 1-handshape on the nondominant hand.

and some verbs can only mark the object due to apparent articulatory constraints. Verbs that start from the subject and move to the object are known as *regular verbs*. In these verbs, the subject is linked to the source and the object to the goal. A small group of verbs known as *backwards verbs* exhibit the opposite direction of path movement (Padden 1988; Meir 1998a; b; 2002). Figure 5 depicts a backwards verb glossed as 1-TAKE-3 in which movement begins at the object and ends at the subject. In backwards verbs, the object is linked to the source and the subject to the goal.

The behavior of directional verbs has led to their analysis as “verb agreement” analogous to that found in spoken languages, notwithstanding modality differences (Meier 1982; Lillo-Martin 1986; Padden 1988; Mathur 2000; Meir 2002; Rathmann & Mathur 2002; Mathur & Rathmann 2010; 2012). Originally labeled *inflecting verbs* by Padden (1988), these verbs are more commonly known as *agreeing* or *agreement verbs*, often interchangeably, in the literature on sign linguistics.³ Alternatively, the verbs are known as *indicating verbs* (Liddell 2000; 2003; de Beuzeville et al. 2009; Cormier et al. 2015; Fenlon et al. 2018). We take a neutral stance as to the grammatical analysis of directionality



Figure 4: The sequence of photographs shows the beginning and ending points of 3-GIVE-1.



Figure 5: The beginning and ending points of 1-TAKE-3.

³ In sign linguistics, verbs are often categorized on the basis of morphosyntactic behavior into three classes: plain, spatial, and inflecting (Padden 1988). Also, the terms *agreement verbs* and *agreeing verbs* are not interchangeable for some researchers like Meier (1982), who considers the former term to pertain to verbs like GIVE that permit verb agreement and the latter term to pertain to verbs that actually show agreement.

and refer to these verbs as *directional verbs* throughout the paper (Fischer & Gough 1978; Baker & Cokely 1980; Casey 2003; Lillo-Martin & Meier 2011).⁴ We will refer to the arguments marked by directional verbs as ‘subject’ and ‘object’.

The lack of consensus over how directionality should be analyzed is rooted in the ongoing debate over pointing. Scholars continue to debate how best to analyze the functions of pointing as used in signed languages (see Cormier et al. 2013 for a review). Pointing appears to share some of the features found in spoken languages pronouns. For example, the distribution of pointing signs appears to be syntactically constrained (Lillo-Martin & Meier 2011). However, pointing also appears to share some features found in pointing gestures used as co-speech gestures (Cormier et al. 2013; Johnston 2013b). The overlap in the features of pointing as used in signed and spoken languages makes it difficult to characterize pointing morphologically and phonologically. Debate about the linguistic status of pointing may also cast doubt on the analysis of directionality as verb agreement, since pointing signs and directional verbs utilize spatial loci similarly in the signing space.

Lillo-Martin & Meier (2011) recast the question of whether directionality can be properly considered as agreement by considering whether directionality can be understood as marking person. Their reasoning was that verb agreement systems encode a limited set of *phi*-features, including person and number. They propose that most directional verb forms can be described by general morphological patterns but that irregular, non-standard forms—particularly first-person object forms—must be specified in the lexicon. On their view, some directional verbs, and their first-person object forms, may be idiosyncratic, or irregular, with respect to one or more of the following dimensions:

1. Absence of first-person object forms
2. Final place of articulation
3. Lexically-specified height
4. Facing
5. Body contact

The regular and irregular patterns of first-person object forms appear to offer morphological evidence for a limited system of person-marking in directional verbs. However, Lillo-Martin & Meier’s proposal hinged on relatively few empirical observations (as noted by Liddell 2011) and did not offer a full analysis of the variety of first-person object verbs that exist in ASL.

In this paper, we report the findings of a systematic investigation of the first-person object forms of directional verbs and reappraise the linguistic status of person in ASL. Our focus is the analysis of first person for several reasons. One, there is some evidence indicating that certain first-person forms are irregular (Meier 1990), but there have been no claims of irregularity in non-first person verb forms. Two, some directional verbs have been documented to lack first-person forms, but no directional verb has been shown to lack non-first person forms (Mathur 2000; Liddell 2003). Three, the identification of first-person object verb forms is generally straightforward. Four, historical studies of emerging sign languages have suggested that first-person object forms may emerge relatively

⁴ Directional verbs are not limited to agreement verbs but also include spatial verbs; the latter also exhibit path movement from one location to another. However, spatial verbs are claimed to only show locative agreement with inanimate and animate referents, not person and number agreement with animate referents (Padden 1988; Meier 2002). Some scholars argue that spatial and agreement verbs should be treated as a unified, singular phenomenon (Quadros & Quer 2008; Quer 2011). When we refer to directional verbs, we will only be referring to agreement verbs. By agreement, we are referring to person inflection, not concord (Cysouw 2011).

late, following the development of the non-first person object forms of directional verbs (Engberg-Pedersen 1993; Meir 2012; 2015).

We will argue that the existence of irregular first-person object forms of directional verbs constitutes evidence for a grammatical category of person. More specifically, we will argue here for a grammatical distinction between first-person and non-first person, as originally proposed by Meier (1990), although note that we will have little to say regarding a distinction between second and third person. We also argue that those irregular forms manifest different morphological patterns from those of regular forms. The conventionalization of irregular first-person object forms points to, at a minimum, a first-person and non-first person system in ASL.

As a starting point for our analysis, we will test the hypothesis that the default first-person location is at the center of the upper chest on the midline. The first person object forms of directional verbs, such as GIVE, move toward this location on the chest, and the first-person object forms of backwards verbs such as TAKE move away from it. This location is the prototypical location of the first-person pronoun ME in ASL; in its citation form, ME contacts the center of the upper chest (Friedman 1975). On this account, the same location at the center of the chest is associated with directional marking of subject and object; this has led to one hypothesis that pronouns are incorporated into directional verbs (Pfau 2011).

Prior work on directional verbs in ASL has observed verbs that are irregular in their place of articulation (Meier 1990), that differ from this hypothesized default location by being articulated at various lexically-specified heights within the neutral space in front of the signer (Liddell 2003), or that lack a first-person object verb form (Mathur 2000; Mathur & Rathmann 2001; Rathmann & Mathur 2002; Liddell 2003). Some work on directional verbs in Danish Sign Language has investigated whether or not those verbs contact the center of the chest in their first person form (Engberg-Pedersen 1993).

Here we examine this hypothesis with a substantial elicited data set; this data set will permit a detailed description of first-person object verb forms in ASL. That analysis will permit us to examine the extent to which 95 ASL verbs show this default first-person location, or deviate from it. We will provide evidence for a default first-person location for directional verbs, but will also show evidence that individual verbs may be specified for first-person object forms that are not consistent with that default.

We will not provide any analysis here of non-first person verb forms. Those forms lie beyond the scope of this paper, since they involve a complex interaction with the signing space surrounding the signer's body and thus may require a separate analysis from first-person verb forms. As previously mentioned, second- and third-person verb forms point to real or "imagined" referents in the signing space, and the spatial locations associated with these referents are varied, whereas the spatial location of first-person forms is fixed; specifically first-person forms occur on or near the signer's body.

2 Methods

Our data have two sources. The first is two rounds of an elicitation study and meta-linguistic interview that we conducted with 16 participants (7 women), all of whom are Deaf native or near-native ASL signers. Our definition of a Deaf native ASL signer is a person who acquired ASL at birth from at least one native or non-native deaf ASL-signing parent. A near-native ASL signer is a person who acquired ASL early in childhood and grew up attending a residential school for the deaf, using ASL as the primary language of communication. The participants varied in level of formal education, ranging from high school to doctorate. All participants were residents of either Austin, TX or Los Angeles, CA at the time of data collection.

There is no publicly available corpus or database of ASL. For this reason, we used a translation task as a convenient way to elicit verb forms from our participants. However, the translation task depended on written English, likely influencing the structure of participants' responses. Some participants exhibited a consistent English-like order in their responses. These observations influenced our decision to focus on analyzing the verb forms exclusively, while disregarding the syntactic structures of our participants' responses.

In our elicitation task, each participant read a list of 100 English sentences, each designed to elicit two forms of an ASL verb. The target verbs were either non-directional or directional. Every stimulus was designed to elicit first and third-person (non-first) forms of the verb; each directional verb had two animate arguments, whereas some non-directional verbs were intransitive.⁵ Out of the set of 100 sentences, 70 targeted directional verbs and 30 filler items targeted non-directional verbs. Three sentences contained two different directional verbs. Thus, the 70 sentences of interest targeted 73 unique directional verbs. Every stimulus item targeted first- and non-first person forms for each verb, thereby leading to a total of 206 targeted verb forms for each participant.⁶

Some target verbs were selected based on discussion in the previous literature of directionality whereas others were selected based on the authors' personal knowledge of ASL and on our observations of directional verbs in ASL video blogs, or vlogs, and in conversations with Deaf signers. A second round of elicitation substituted a small set of directional verbs that were not targeted in the first round of elicitation. These verbs do not appear to be well cited in literature, but they exhibited directionality in some of the participants' responses. We followed up on these verbs in participant interviews. The data from the first and second rounds of elicitation are analyzed together. For those verbs that were only elicited in the second round, we have a maximum of five tokens available.

Each stimulus sentence appeared with a short video clip, in which a female Deaf native ASL signer demonstrated the citation form of the target form. The citation form of a sign is the form that would be listed in a dictionary entry. It is the form of a sign that is produced in isolation, in response to a question such as "What's the sign for X?". In the case of a citation form of a directional verb, no referents have been assigned to the endpoints of the sign's movement; that is, the verb form does not convey information about any arguments. Underneath the video clip, an English sentence was presented with the target verb underlined. An example sentence for the target *bust* is: *I busted him for stealing candy, but he did not bust me for stealing milk*. Each stimulus was presented as a presentation slide on a laptop. The participant and the experimenter sat facing one another with the laptop in front of them. An example of a stimulus item is presented in Figure 6.

There were a handful of verbs that could be considered spatial verbs (e.g. VISIT in the stimulus sentence: *Last year, she visited me in San Francisco. This year, I visited her in London.* or INVITE in the stimulus: *She invited me to his birthday party, so I invited her to my birthday party.*). These verbs also had two animate arguments. It is possible that some participants treated these verbs as spatial verbs for non-first person object forms, but for first-person object forms, there was no way of differentiating the signer's body as first person versus the spatial location associated with a locative argument.

⁵ The argument structure of a directional verb in ASL is not always the same as its English gloss (Fischer & Gough 1978). Our participants were sensitive to this. The sign FLIRT is an example of a transitive ASL verb whose English gloss is intransitive and requires a prepositional phrase headed by *with*, as in the English stimulus: *I tried to flirt with her, but she did not flirt with me back*. However, in their translations, all participants ($n = 12$) treated it as a transitive verb by producing a sequence of a verb plus a direct object. None used the sign WITH. Evidence such as this indicates that our participants were not producing literal, sign-for-word translations of the English stimuli.

⁶ Due to experimenter error the original stimulus sentence for the verb KISS did not target the appropriate directional verb forms. This sentence was corrected to read: *I kissed him, and he kissed me*.

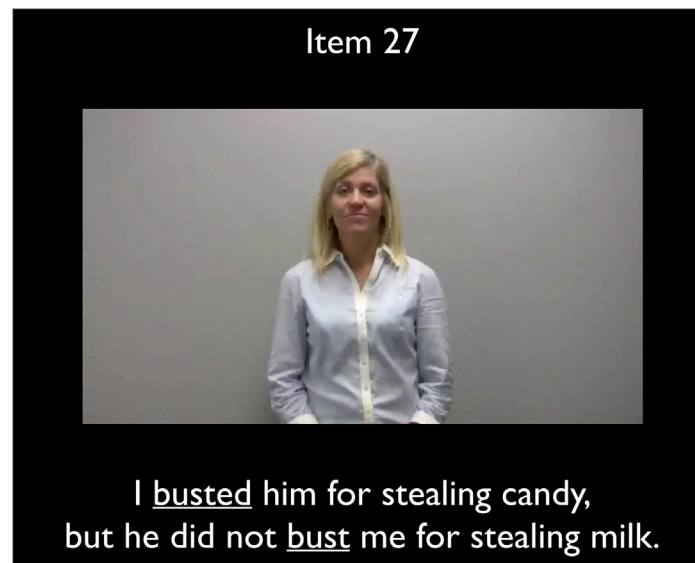


Figure 6: A stimulus item.

The order of the stimuli was randomized. Participants were instructed to translate the English sentences into ASL to the best of their ability and had the freedom to express the meaning of the sentences in any way as long as they used the target verb in any form. In their responses, participants had the option of using the Deaf experimenter, the first author, as a real-world referent for marking the non-first person object. Once the participant completed the task, the participant and the experimenter had a semi-structured metalinguistic discussion. First, the experimenter asked the participant to review the stimuli for anything that struck them as unclear, vague, or disagreeable. In this way, the participant could offer their own perspective about the target signs. For example, some participants said that they preferred the fingerspelled form of the directional verb #EMAIL over the non-fingerspelled form E-MAIL, which was the targeted verb form. Second, the experimenter reviewed each participant's responses on the spot and interviewed them about the availability of first-person object forms for specific directional verbs. All sessions were conducted either in the University of Texas Signed Language Lab or off-campus elsewhere. We recorded all sessions on digital videotape (and later a memory card) using a high-definition video camcorder. We subsequently uploaded and processed the video data in a video editing program in order to transcribe, code, and analyze the data on ELAN.

Our second source of data is from the Internet; these data are intended to supplement our elicited data. We wanted to use Internet data to see how these more naturalistic data would compare to the elicited data. The Internet data come from a total of 26 video sources: 18 vlogs and 8 instructional movies from a website called ASLonline, sponsored by the University of Texas at Austin. Twenty-one video sources are monologues by Deaf native and near-native ASL signers while 5 are conversations between at least two Deaf signers. The number of signers totaled 33, of which 6 appeared in more than one video. The ASLonline movies are a part of an instructional website for the university's ASL language courses; their design was entirely unrelated to the current project. In all vlogs but one, the signer had no direct, face-to-face interaction with a live audience. Half of the vlogs featured standing signers; in the other half the signers were sitting. In 4 vlogs, it was unclear whether the signer was standing or sitting. In 5 of the 8 movies, there were two or more interactants conversing and sitting face-to-face; in three movies there was only one signer, who was standing. The total duration of the vlogs was about 2 hours 23 minutes and the movies one hour. Table 1 presents a summary of the Internet data, broken down into by

Table 1: Summary of the Internet dataset.

Video source	Genre	# of video clips	# of signers	Total duration
ASLized!	All monologues	3	12	0:30:46
ASLonline	3 monologues, 5 conversations	8	13	1:05:06
Joey Baer	All monologues	6	1	0:21:37
Facundo Element	All monologues	1	1	0:09:07
Ella Mae Lentz	All monologues	3	1	0:18:46
NADvlogs	All monologues	1	1	0:11:33
National Interpreter Education Circle	All monologues	1	1	0:18:07
Street Leverage	All monologues	1	1	0:24:30
T.S. Writing	All monologues	1	1	0:04:14
Virtual Deaf Church	All monologues	1	1	0:04:27
<i>Total</i>	<i>5 conversations, 21 monologues</i>	<i>26</i>	<i>33</i>	<i>3:28:13</i>

source, genre, the number of video clips from each source, the number of signers, and the duration of each source. The links to the video sources are listed at the end of this paper.

For coding the data from both the elicitation task and the Internet data, we established criteria to identify whether a verb form was a first-person object form. Our criteria are primarily based on the work of Fischer & Gough (1978), Meir (2002), Mathur & Rathmann (2001), and Rathmann & Mathur (2002). All those researchers posit that directional verbs employ one or both of two mechanisms of argument marking: (1) the direction of path movement, and (2) the orientation, or facing, of the hands.⁷ The combination of both path movement and orientation is arguably the prototypical means for encoding the location associated with the object argument of a verb. But some verbs only employ one of these mechanisms; they show directionality only through path movement or only through the orientation of the hands. For verbs that show facing, part of the hand such as the palm or the fingertips is oriented towards the object. A third mechanism for argument marking is locationality, which refers to the spatial displacement of the verb to a location associated with its argument (Fischer & Gough 1978). Locationality is not restricted to directional verbs but can also apply to plain verbs.

We identified and coded a verb as a first-person object form if the sign exhibited path movement, hand orientation, and/or locationality towards the signer, as shown in Figure 4 for 3-GIVE-1.⁸ However, we did not code a verb as a first-person object form if it only exhibited locationality near the signer, because it was difficult to distinguish first- and non-first person forms based only on the distance between the verb form and the signer. We judged a verb form to be non-first person object if the path movement and/or orientation targeted the location associated with an object referent other than the signer. The object could be the real-world location of the experimenter, who served as a non-first person referent, or it could be an arbitrary location in the signing space. We examined the signer's non-manual behaviors including eye gaze and head and body shifts to determine whether they were directed at the object. Eye gaze, however, was not a consistent and reliable marker of non-first person reference, because the signer would often sign and look at the computer screen at the same time.

⁷ Fischer & Gough (1978) refer to the second mechanism of argument marking as “reversibility”.

⁸ If the verb token exhibited locationality, but not path movement and hand orientation toward the signer, we did not code it as first person.

Two additional criteria that we established for coding the data from the Internet dataset pertain to the lexical status and argument structure of the directional verb. First, any candidate verb form had to function as a verb, not as a noun. Some sign forms are indeterminate with respect to lexical status. An example is the sign RESPECT; the citation form can be used as either a noun or a verb (and hence can be hard to distinguish from a non-first verb form). We examined the broader linguistic context in which the sign appeared by checking if it functioned as a predicate. Second, verbs were coded as directional only if they selected animate arguments for both subject and object; directionality has been argued to be obligatory with verbs that have two animate arguments (Rathmann & Mathur 2002).⁹ In their corpus study of directional verbs in British Sign Language, Fenlon et al. (2018) found that a directional verb was more likely to be spatially modified for the object if the arguments of the verb were animate than if they were inanimate or locative. All verb forms from our Internet dataset that met our criteria were coded and analyzed; candidate forms that did not meet the criteria were discarded. Once we coded the verbs for person, we coded them for four additional features:

1. *Location*. For each sign we coded two locations: initial and final. An area on the signer's body was coded if the verb contacted or approached that body location. Each coded location was assigned to one of the following categories: abdomen, chest, collarbone, neck (front or side), shoulder (ipsilateral or contralateral), lower face, upper face, whole face, or neutral. A neutral location is any location in the signing space ahead of the signer.
2. *Height*. For signs produced in neutral space, we coded the height of a verb's ending point with respect to landmarks on the signer's body. Verbs that actually contact a place of articulation on the body will, for purposes of the height analysis, be said to begin or end at the height of that place of articulation. For example, the verb form GIVE-1 can contact the center of the signer's upper chest and will be said to be produced at chest height. We judged the height of a verb form by noting the topmost part of the dominant hand and assigning the form one of the following values: whole face, upper face, lower face, neck, shoulder, collarbone, chest, or abdomen.

Many signs are two-handed and fall into one of two categories based on their phonological structure. Symmetrical two-handed signs are those signs in which the two hands share the same hand configuration and movement, whereas non-symmetrical signs are ones in which the two hands differ in their movement such that one hand, the dominant hand, moves and the other does not (Battison 1978); the two hands may also differ in hand configuration. In our dataset, we observed that symmetrical two-handed signs often exhibited a disparity in the height of the two hands – one hand, the dominant hand, was often distinctly higher than the other hand. We coded the topmost part of dominant hand.

3. *Facing*. Facing pertains to the modification of a directional verb such that some part of the hand is oriented towards the locus associated with the object. Meir (1998a; b) specifically defines facing as the palm or fingertips, or both, being oriented toward some location (i.e., the fingertips or palm “point”). This is illustrated in the ASL verb TEACH-2/3 and TEACH-1 in Figures 7 and 8, respectively. The verb form TEACH-2/3 does not have the fingertips or palm oriented toward the location of the object whereas TEACH-1 has the fingertips of both hands facing the object.

⁹ In monotransitive verbs, verb agreement is claimed to occur between the subject and the direct object, whereas in ditransitive verbs, it occurs between the subject and the indirect object.



Figure 7: TEACH-2/3.



Figure 8: TEACH-1.

Some signs have static handshapes and others have dynamic handshapes in which hand configuration changes from one shape to another over the course of the sign. We coded the facing of dynamic handshapes if the fingertips and/or palm are oriented towards the object during articulation.

Some elicited verb forms were non-symmetrical two-handed signs that had a non-dominant hand that served as a base hand *and* had the dominant hand facing the non-dominant hand. In Figure 9, OWE-1 has the dominant hand contacting the non-dominant hand. In such two-handed signs, the dominant hand obligatorily contacts the non-dominant hand and thus is constrained from showing facing. Hence it is not clear how facing would occur in such two-handed signs under Meir's definition, and for that reason, we did not code facing.

4. *Contact*. Contact pertains to the verb form physically contacting the signer's body, either at the verb's initial or final location. We coded a first-person object verb form for contact if we judged it to touch the signer's body. We also coded the contacting region of the hand, that is, which part of the hand touched the body. In non-symmetrical two-handed signs, we coded the dominant hand but not the non-dominant hand.

3 Results

The task was designed to elicit 3,255 tokens of directional and non-directional verbs (205 verb forms \times 11 participants in the first round of elicitation; 200 verb forms \times 5 participants in the second round). There were some technical, experimenter, and participant

errors, including the participants' substitution or omission of verbs. Hence, only a small number of responses are missing from the elicitation dataset; 3,206 tokens are available for analysis. For most stimuli, all 16 participants followed the instructions in producing two distinct forms of the target ASL verb after they viewed a video showing that target ASL verb and an English sentence containing two forms of the corresponding English verb.

We identified 98 unique directional verbs in our participants' responses.¹⁰ Of these verbs, 88 were identified as regular verbs and 10 as backwards verbs. Even though we targeted only 73 directional verbs, the study yielded 98 directional verb types due to participants' substitutions for some targeted verbs. For example, in the first round of elicitation, three participants replaced the target verb TEASE with another directional verb, TORMENT, as shown in Figures 10 and 11. Seven participants replaced the target verb EMAIL with the fingerspelled variant #EMAIL. These substitutions provided opportunities to identify



Figure 9: OWE-1.



Figure 10: TEASE-2/3.

¹⁰ If a verb occurred with a base hand or an entity classifier, rendering it a non-symmetrical two-handed sign, we glossed that two-handed form separately from the one-handed form and thus counted these forms as representing two sign types.



Figure 11: TORMENT-2/3.

Table 2: Number of first-person object responses for each participant in the elicitation task.

Participant	Total of VERB-1 tokens of directional verbs
1	48
2	60
3	57
4	58
5	32
6	21
7	53
8	47
9	35
10	54
11	47
12	50
13	61
14	59
15	55
16	67
<i>Total</i>	804

which verbs, directional or not, deaf signers preferred and to document directional verbs that may have not been reported previously. In the second version of the elicitation task we replaced the target verbs with the substitutions.

We identified 1117 responses in contexts that targeted first-person object forms; 804 first-person forms were actually elicited. Thus, 72% of the first-person contexts yielded verbs that were modified for first person. For individual participants, the total number of elicited first-person object forms ranged from 21 to 67 ($M = 50.25$, $SD = 12.01$). Table 2 presents the number of first-person object responses for each participant.

Two independent coders who were fluent in ASL, one deaf and another hearing, coded 24% of the dataset, or 775 tokens from four participants, for whether the verb form was first person. Intercoder agreement was 97.0%. Appendix A displays the results for all directional verbs. In the second column of this table, the numerator represents the number of first-person object verb forms that were elicited; the denominator represents the total number of responses that included this verb in a first-person object context.

Some target verbs, for example GIVE, uniformly yielded responses containing a directional verb form. Target verbs that elicited a first-person object verb form from 90% or more of our participants included #EMAIL, ANALYZE, ASK, AWARD, BEAT, BITE, CALL-BY-PHONE, CATCH, DEFEAT + BASE, FILM, FORCE, FORCE + BASE, GIVE, HIRE, INFORM, INSULT, INUNDATE, INVITE, MOOCH, PITY, REMIND, SEND, THROW, TRUMP, and X-GIFT. The stimuli targeting verbs such as #EMAIL, CALL-BY-LINE, GIVE, INFORM, and INSULT elicited a first-person verb form from all participants. For some verbs, some participants replaced the target verb with a plain verb. An example was the substitution of VOMIT for HATE.¹¹ Such plain-verb responses were excluded from the total number of possible responses for a given directional verb. However, if the participants replaced the target verb with another directional verb, we included that token in the results for that non-targeted verb.

In our subsequent analyses, we exclude the following three directional verbs: BITE, EXAMINE, and KISS. These three verbs varied with respect to the height and location of the object locus for reasons that are unrelated to person. These verbs assign a part of the signer's body as the locus for an argument by moving towards that body part (Fischer & Gough 1978). The English sentences used in our elicitation task were ambiguous with respect to which part of the body was targeted by the action, e.g. the sentence *She bit me* does not specify where the person was bitten. Overall, our subsequent analyses include 95 directional verbs, not the original count of 98.

In the Internet data, we identified 424 tokens of directional verb forms that fit our criteria based on the lexical status and argument structure of the verb, and further identified 87 of those verbs as first-person object forms. Approximately 21% of the Internet dataset consists of first-person object forms. Appendix B summarizes the results from the 27 videos we used. Many verbs listed in Appendix B were also targeted in the elicitation study; see Appendix A. The highest token frequency of a directional verb in the Internet dataset was LOOK-AT ($n = 127$), which occurred in 24 of 27 videos. This result is consistent with Morford & MacFarlane's (2003) suggestion that LOOK-AT is a high lexical frequency directional verb in ASL.

3.1 Directional verbs without first-person object forms

The prior literature on directional verbs indicates that some verbs cannot be modified for first-person object, although all can be modified for a non-first person object (Mathur 2000; Mathur & Rathmann 2001; 2006). If a verb lacks a first-person object form, the signer must produce an overt pointing sign to herself for first-person reference. We start with an analysis of those verbs that have previously been argued to lack a first-person object form. Mathur (2000) lists a few: BEG, ENCOURAGE, FLIRT, KILL, and KISS-FIST.^{12,13} Liddell (2003) also reports that FLIRT lacks a first-person object form. Based on these

¹¹ The verb glossed VOMIT not only denotes what it means in English, but it is also synonymous with HATE and can take a syntactic direct object. In our dataset VOMIT behaved as a plain verb and was not directional.

¹² Padden (1988) lists ENCOURAGE as a plain verb, but Mathur (2000) lists it as an agreement verb on the basis of the verb's argument structure. ENCOURAGE requires two animate referents, an agent and a patient.

¹³ The sign KISS-FIST is a positive affective verb that can be translated to 'to be crazy about' or 'to be fond of' in English. This sign is sometimes glossed as ADORE or LOVE, but we have chosen KISS-FIST, as is now standard in the U.S. Deaf community, because the sign literally resembles the action of kissing one's fist on the back.

claims, we included BEG, ENCOURAGE, FLIRT, KILL, and KISS-FIST in our elicitation task to see whether our participants would produce first-person object forms for those verbs. Table 3 reports the results.

Figure 12 shows the citation form of FLIRT. This form has outward-facing fingertips and contact between the two thumbs. According to Mathur (2000), the production of a directional form FLIRT-2/3 is acceptable, but the form *FLIRT-1 shown in Figure 13 is ill-formed.

Table 3: Elicited use of first-person object verb forms with verbs argued to lack a first-person form.

Directional verbs without first-person object forms from the elicitation task	
BEG-1	1/11
ENCOURAGE-1	9/15
FLIRT-1	5/12
KILL-1	9/16
KISS-FIST-1	0/11



Figure 12: The citation form of FLIRT.

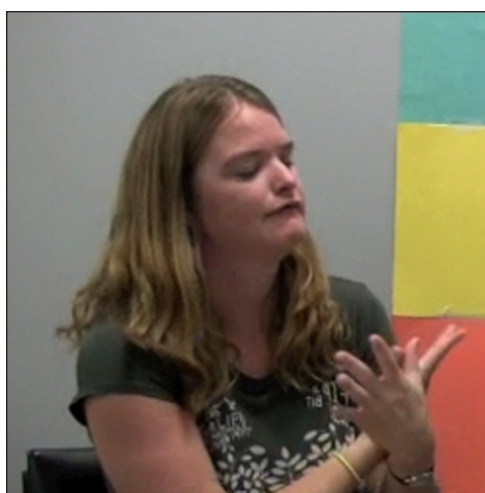


Figure 13: The ill-formed verb *FLIRT-1.

None of our subjects produced this sign. This particular form of *FLIRT-1 preserves contact between the thumbs, but otherwise yields a change in the shape of the verb which, when we interviewed them, our participants judged to be physically awkward. Mathur attributes the unacceptability of *FLIRT-1 to an articulatory (physical) constraint, whereas Liddell (2003: 114) states that “the unacceptability of FLIRT-1 is not due to a physical constraint, but is simply a lexical fact.”

However, as seen in Table 3, five participants offered a solution for FLIRT-1; they did so by producing a path movement toward the signer without changing the facing of the fingertips, as shown in Figure 14. This form has not previously been reported in the ASL literature. Its status among native ASL signers warrants further investigation.

The verbs ENCOURAGE and KILL have also been reported to lack first-person object forms because those forms, similar to FLIRT-1, are blocked by specific articulatory constraints that bar forms exceeding the threshold of “comfortable signing” (Mathur 2000). Our 9 participants who produced ENCOURAGE-1 reversed the direction of the path movement toward themselves. For KILL-1, a non-symmetrical two-handed sign with a non-dominant base hand, 9 participants likewise reversed the movement of the dominant hand; in doing so they modified the contacting region on the dominant hand, producing forms with ulnar edge (little-finger edge) contact against the non-dominant palm. Follow-up interviews with these participants confirmed that they accepted these forms of ENCOURAGE-1 and KILL-1 as being grammatical. Participants who did not produce ENCOURAGE-1 and KILL-1 judged those forms to be ill-formed.

Two other verbs, CATCH + ENTITY (0/9) and CHASE (0/11), did not elicit a single first-person object form. It may be the case that they are not true directional verbs or that they cannot mark first person object, but further investigation is warranted. Mathur (2000) lists CHASE as a directional verb that can be modified through locationality, but he does not offer any discussion about whether it can mark first-person object.

From the Internet data, we identified five pertinent verb types: ENCOURAGE ($n = 6$), FLIRT ($n = 1$), KILL ($n = 1$), CHASE ($n = 1$), and CATCH + ENTITY ($n = 1$). None of the tokens was spatially modified for first-person object, with the possible exception of FLIRT-1. Five tokens of ENCOURAGE were produced by a single signer; 2 tokens had a first-person object referent that had previously been mentioned in the narrative. These tokens were not spatially modified for first-person object, suggesting that ENCOURAGE-1 may not have been part of the signer’s lexicon. The sixth token of ENCOURAGE was produced by another signer in a different video; the referent of the object was not first-person. We interpreted the sole token of FLIRT as a reciprocal with first- and non-first person referents ‘she and I flirted with each other’; the path movement within the reciprocal FLIRT was similar to the movement of FLIRT-1 in Figure 12. Overall, all five tokens of FLIRT-1



Figure 14: The beginning and ending points of FLIRT-1, as produced by five signers.

from the elicited data and the reciprocal form of FLIRT from the Internet data exhibit path movement toward the signer, while maintaining the orientation of the fingertips.

In conclusion, some transitive verbs that have been said to lack first person forms may be gaining them, or may show individual variation with respect to whether or not they have first-person forms. Other transitive verbs—e.g. KISS-FIST or CHASE—seem to lack a first-person form, but we need better evidence that these verbs are in fact directional verbs.

3.2 Location, or place of articulation

The typical, citation-form directional verb does not contact the signer’s body. The initial location of GIVE-CF is at a spatial locus proximal to the signer’s chest from which it moves outward. In our elicitation task, the majority of the verbs fit this pattern, although they varied in the height of their initial location. The prevalent starting and ending points (initial and final places of articulation, respectively) of the citation form are located in the neutral space in front of the signer’s body, usually at chest height. But there are exceptions to this generalization, as we explore next.

3.2.1 Verbs that are anchored on the face

Some citation-form verbs are lexically specified to have the starting and/or ending point be on or near a part of the signer’s body and thus have been called *body-anchored* (Mathur 2000; Meir et al. 2007; Lillo-Martin & Meier 2011; Meir et al. 2013). The only body-anchored directional verbs in our data are anchored on the face. We refer to verbs whose citation forms are lexically specified to start on, or near, a part of the signer’s face as *face-anchored verbs*; eight such verbs were targeted in our elicitation task. Those verbs are listed in Table 4. When they are produced in citation form, the ending point occurs in the neutral signing space.¹⁴

Table 5 lists the results from the elicited data on the variant starting and ending points of the first-person object form for each face-anchored verb.

The anchored first-person object verb forms do not mark the subject; these forms are said to exhibit “single agreement” (Meier 1982). However, most face-anchored verbs can de-anchor from the signer’s face, to start at the neutral-space locus associated with the subject and move towards the object, thereby exhibiting “double agreement” or agreement with the subject and object (Meier 1982; Janis 1995; Meir 1998b; Mathur 2000). However, IGNORE-1 and TELL-1 were exceptions, as shown in Figures 15 and 16. Our

Table 4: Elicited initial and final places of articulation in the citation forms of face-anchored verbs.

VERB-CF	Initial place of articulation	Final place of articulation
CALL-BY-PHONE	Side of face	Neutral
HONOR	Forehead	Neutral
IGNORE	Nose	Neutral
INFORM	Forehead	Neutral
ORDER	Mouth/chin	Neutral
RESPECT	Forehead	Neutral
TELL	Mouth/chin	Neutral
VISIT	Face (at the eyes)	Neutral

¹⁴ Note that we might have expected KISS-FIST to fall in this class of face-anchored directional verbs. However we elicited no first-person object forms for this verb.

Table 5: Frequency of variant initial and final places of articulation in first-person object forms of face-anchored verbs from the elicitation task.

VERB-1	Elicited Variants	Initial places of articulation: Anchored/Neutral	Final places of articulation: Chest/Elsewhere
CALL-BY-PHONE	3	1/15	11/5
HONOR	2	1/7	8/0
IGNORE	1	7/0	7/0
INFORM	2	4/11	15/0
ORDER	2	12/2	14/0
RESPECT	2	3/11	14/0
TELL	1	14/0	14/0
VISIT	2	9/1	10/0



Figure 15: Beginning and ending points of IGNORE-1.



Figure 16: Beginning and ending points of TELL-1.

participants produced no de-anchored forms of these verbs; all elicited tokens preserved the initial location on the face from the citation form. For most signers, ORDER-1 may also be barred from de-anchoring from the face, but the two elicited tokens of the detached variant suggest that some signers find the de-anchoring of this verb felicitous.

Note that our elicitation task did not yield any tokens of the anchored, but nonetheless doubly-agreeing forms of verbs such as CALL-BY-PHONE that were described for ASL by Meir et al. (2013); these forms exhibit an arcing path movement from the lexically-specified

location on the face to the locus associated with the subject and then continued movement to the location associated with the object.¹⁵ One possible reason that we did not elicit any such forms is that our stimuli did not probe linguistic contexts with a third-person subject and a third-person object.

From our Internet data, we identified 50 tokens of face-anchored directional verbs, of which just 8 are first-person object forms: CALL-BY-PHONE-1 ($n = 2$) and TELL-1 ($n = 6$). Both tokens of CALL-BY-PHONE-1, produced by two different signers, had the neutral location as the initial place of articulation and the side of the face as the final place of articulation. All 6 tokens of TELL-1 started at the chin and ended at the chest. The set of naturalistic data results for the first-person object verb forms of CALL-BY-PHONE and TELL are consistent with the elicitation results for these two verbs. In particular, the naturalistic data confirm that the first-person object form of CALL-BY-PHONE can have the face as its final place of articulation; they also confirm that TELL does not de-anchor from the chin as its initial place of articulation.

In sum, the face-anchored verbs are lexically specified as having the face as the initial place of articulation, yet most of these verbs have the option of de-anchoring; this appears to be the preferred outcome. However, IGNORE and TELL do not have this option.

3.2.2 First-person verb forms with a final place of articulation other than the center of the chest

For most first-person object forms of directional verbs that allow final contact with the body, including the face-anchored verbs of Table 3, the signer's chest is the typical final place of articulation. An example is GIVE-1, for which all 15 tokens landed at the chest. However, there are three verbs whose first-person object forms did not land at the chest but landed elsewhere: CALL-BY-PHONE, CONVINCING, and REMIND in Figures 17, 18, and 19.¹⁶

Table 6 lists the final place of articulation of each of these verbs. For CALL-BY-PHONE-1, most signers landed it at their chest, but a few landed it at their face (cheek). For CONVINCING-1, all 10 signers who produced this form landed it either on the sides of their neck or on the collarbone at the base of the neck. For REMIND-1, signers landed it on their shoulder, either on the ipsilateral or contralateral side.

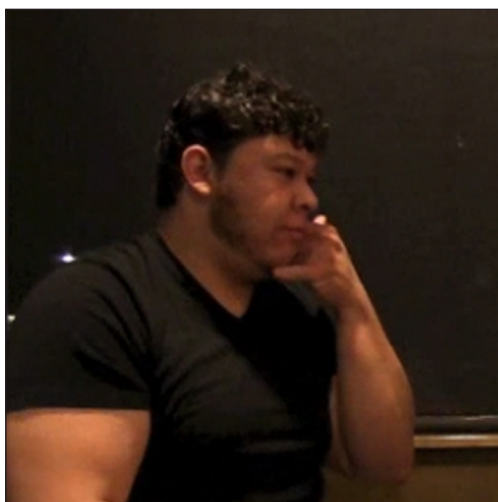


Figure 17: CALL-BY-PHONE-1 landing at the face.

¹⁵ Meir et al. (2013) used the gloss TELEPHONE for the sign we gloss CALL-BY-PHONE.

¹⁶ We also elicited 12 tokens of CONVINCING + ENTITY, with 9 being first-person forms. This verb consists of a one-handed variant of CONVINCING on the dominant hand and a 1-hand on the non-dominant hand that indicates a human entity. The dominant moves to contact with the non-dominant 1-handshape.



Figure 18: CONVINCE-1 landing at the sides of the neck.



Figure 19: REMIND-1 landing at the shoulder.

Table 6: Elicited data for first-person verb forms with final places of articulation other than the center of the chest.

Elicited data		
VERB-1	VERB-1 tokens	Final place of articulation
CALL-BY-PHONE-1	16	Face (<i>n</i> = 5), Chest (<i>n</i> = 11)
CONVINCE-1	10	Neck sides (<i>n</i> = 5), Collarbone (<i>n</i> = 5)
REMIND-1	13	Shoulder (ipsilateral, <i>n</i> = 8; contralateral, <i>n</i> = 5)

CALL-BY-PHONE-1 is the only example of a face-anchored directional verb that has two distinct body areas as variant final places of articulation, the chest (as is typical for face-anchored verbs) and the face itself. By contrast, the relatively uniform results for CONVINCE-1 and REMIND-1 show that they are fixed in their final place of articulation; they do not have the chest as an option. The variation in the data on CONVINCE-1 between the neck and the collarbone may be an instance of the kind of lowering that is widely attested in ASL for non-directional signs, including verbs, that have citation forms produced at high places of articulation (Russell et al. 2011; Mauk & Tyrone 2012; Tyrone & Mauk

2012). We will report further evidence of this phenomenon in §3.4. The variation that we encountered in the place of REMIND-1 also appears in some non-verb signs, e.g. RELIGION.¹⁷ According to one website, ASL-Lex (<http://asl-lex.org/>), RELIGION is articulated on the ipsilateral shoulder whereas the website Signing Savvy indicates that this sign is articulated on the contralateral shoulder (<https://www.signingsavvy.com>).¹⁸

The lowering of REMIND-1 appears to be contingent on the ipsilateral versus contralateral side. The final location of the verb form tends to be lower on the contralateral shoulder, e.g. lower than the shoulder blade, than that on the ipsilateral shoulder. Contralateral movement has a greater range of motion compared to ipsilateral movement, thus there is more room for lowering of REMIND-1 on the contralateral shoulder. Nevertheless, the final location of REMIND-1 is still restricted to the shoulder area.

In the Internet data, we identified 9 tokens of first-person object verb forms that contact the signer's body at a location other than the chest. These forms are CALL-BY-PHONE-1 ($n = 2$), CONVINCENCE-1 ($n = 3$) and REMIND-1 ($n = 4$). This is summarized in Table 7.

For CONVINCENCE-1, one signer produced one token on the sides of the neck, while another signer produced two tokens on the collarbone; coincidentally, this signer also participated in the elicitation task and produced similar results. For REMIND-1, one signer produced three tokens on the contralateral shoulder, while another signer produced one token on the ipsilateral shoulder.

In sum, the Internet data and the elicitation data are consistent. The verb forms CONVINCENCE-1 and REMIND-1 are unusual with respect to their final place of articulation on the signer's body. This is also true of the face-contacting variant of CALL-BY-PHONE-1.

3.3 Contact

Directional verbs have been observed to vary in whether first-person object forms permit final contact on the signer's body (Lillo-Martin & Meier 2011). Some first-person object forms such as ASK-1 and SAY-NO-TO-1 were believed to be prohibited from having final contact with the body, whereas other verbs such as GIVE-1, INFORM-1, and TELL-1 allow final contact. Here we ask which first-person verb forms show final contact. Table 8 presents the results of 26 verbs from the elicitation task that showed contact with the body. The 69 other verbs—including SAY-NO-TO-1 (0/14) and OFFER-1 (0/7)—did not show contact. When contact occurred, it was at the center of the chest, except in the verbs CALL-BY-PHONE-1, CONVINCENCE-1, and REMIND-1. These three verbs showed contact at locations other than the center of the chest; see §3.2.

Table 7: Internet data for first-person verb forms with final places of articulation other than the center of the chest.

Internet data		
VERB-1	VERB-1 tokens	Final place of articulation
CALL-BY-PHONE-1	2	Face ($n = 2$)
CONVINCE-1	3	Neck sides ($n = 1$), Collarbone ($n = 2$)
REMIND-1	4	Shoulder (ipsilateral, $n = 1$; contralateral, $n = 3$)

¹⁷ A dictionary form for RELIGION can be found at <https://www.signingsavvy.com>.

¹⁸ We are not aware of any studies about whether variation in the ipsilateral versus contralateral productions of signs is due to phonetic or phonological processes. Nor are we aware of any studies about whether ipsilateral and contralateral productions of signs constitute variants of one sign or separate signs. However, consistent with our glosses for signs like REMIND and RELIGION, we treat these productions as variants of one sign.

Table 8: Frequency of contact in first-person object verb forms.

Elicited data	
Directional verb	Contact/VERB-1
ASK-1	5/15
AWARD-1	2/2
BLAME-1	6/14
BUST-1	6/9
CALL-BY-PHONE-1	9/16
CATCH-1	2/2
CONVINCE-1	9/10
FORCE-1	4/15
GIVE-1	15/15
1-HIRE	3/5
HONOR-1	2/8
IGNORE-1	7/7
INFLUENCE-1	1/14
INFORM-1	10/15
INSULT-1	15/15
1-INVITE	9/15
LEAVE-ALONE-1	6/14
PAGE-1	5/10
PAY-1	1/19
ORDER-1	11/14
REMIND-1	12/13
RESPECT-1	9/14
TELL-1	13/13
TEXT-MESSAGE-1	1/3
VISIT-1	1/10
X-GIFT-1	13/16

The verbs that showed consistent final contact with the signer's body, that is, contact at least 90% of the time in our data, are CONVINCE-1, GIVE-1, IGNORE-1, INSULT-1, REMIND-1, and TELL-1.¹⁹ Other verbs that showed final contact 50% or more of the time are BUST-1, CALL-BY-PHONE-1, 1-INVITE, ORDER-1, PAGE-1, RESPECT-1, and 1-HIRE (although note that we elicited only five tokens of HIRE). Verbs that showed infrequent contact include: ASK-1, BLAME-1, FORCE-1, HONOR-1, INFLUENCE-1, LEAVE-ALONE-1, PAY-1, and VISIT-1. We look now at the results from the Internet data in Table 9.

The naturalistic data on CALL-BY-PHONE-1, CONVINCE-1, GIVE-1, INSULT-1, REMIND-1, and TELL-1 in Table 9 are compatible with the results from Table 8. One exception is that two tokens of OFFER-1 contact the signer's body, which was not attested in the elicited data.

Overall, our results suggest that final contact does not occur in the first-person forms of most directional verbs. However, a group of verbs including CONVINCE-1, GIVE-1, IGNORE-1, INSULT-1, REMIND-1, and TELL-1 may be lexically specified for contact with

¹⁹ Note that INSULT-1 does not show contact at the endpoint of movement, but rather midway through the movement, when the hand sweeps against the signer's chest.

Table 9: Frequency of contact, and place of contact on the signer's body from the Internet data.

Internet data		
Directional verb	Contact/VERB-1	Place of contact
ASK-1	0/9	–
CALL-BY-PHONE-1	0/2	Lower face
CATCH-1	1/1	Chest
CONVINCE-1	3/3	Sides of the neck, collarbone
GIVE-1	5/6	Chest
INSULT-1	1/1	Chest
OFFER-1	2/3	Chest
PAY-1	0/1	–
REMIND-1	4/4	Shoulder
TELL-1	6/6	Chest

the signer's body.²⁰ All of the face-anchored verbs appear to allow final contact on the signer's body, although contact was infrequent for HONOR and VISIT.

3.4 Height

Directional verbs that indicate a real-world or arbitrary location have been observed to occur at different heights, such that some verbs indicate locations at chest height (e.g. GIVE) but others indicate locations at abdomen height (e.g. INVITE) or nose height (e.g. SAY-NO-TO) and various heights inbetween (Liddell 2003). Some of the arbitrary locations are said to be imagined based on the height of the referents, which can influence the spatial modification of first-person object forms. We selected 53 verbs from our data; those verbs are either one-handed signs or symmetrical two-handed signs. For symmetrical two-handed signs such as MOCK and TEACH, we judged their height based on the signer's dominant hand. We did not examine non-symmetrical two-handed verbs such as INFLUENCE, FORCE + BASE, or REMIND + ENTITY. The full results are in Appendix C.

We assigned each verb token to a height category based on our coding of the verb form's height at its ending point. Of the 564 coded tokens, 365 tokens (64.7%) were at chest height, 122 (21.6%) at the lower face, and 46 (8.2%) at the front of the neck. There were smaller numbers for the upper face (16 or 2.8%), the collarbones (5 or 0.9%), the sides of the neck (5, 0.9%), and the whole face (5, 0.9%). Thus, two height values—the chest and the lower face—were frequent.

We also considered how many verb types occurred at each place of articulation. For 42 verb types, the chest is the most common height, with 14 verbs having all tokens in this category. 27 verbs were typically articulated at the lower face and 22 at the front of the neck, whereas just one verb was typically produced at the height of the whole face (FILM), one at the shoulder (REMIND), one at the collarbone or the sides of the neck (CONVINCE), and seven at the upper face. We did not elicit any tokens of a first-person verb form at abdomen height. The sole verb that has previously been argued to be articulated at abdomen height (INVITE) was produced at the chest by all 15 participants from whom this verb was elicited.

Many verbs did not show a unique height value. For example, in our dataset, the 15 tokens of ASK-1 displayed three height values: lower face ($n = 5$), front of neck ($n = 3$), and chest ($n = 7$). Figures 20 and 21 show ASK-1 produced at the height of the lower face

²⁰ One reviewer questioned our suggestion that certain first-person verb forms are lexically-specified for contact. We are not committing to a particular analysis of contact in directional verbs. The role of contact in the formation of ASL directional verbs is understudied and not well understood.

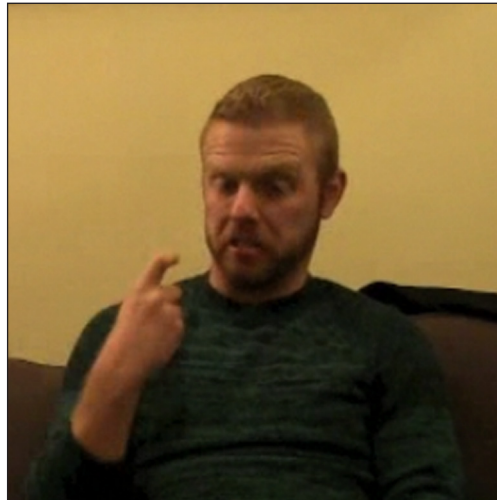


Figure 20: ASK-1 at the height of the lower face.



Figure 21: ASK-1 at the height of the chest.

and the chest, respectively. Across all the verbs, 24 verbs exhibited two height values and 12 three height values; only 17 verbs exhibited one unique height value. For example, ASK-1 displays three height values. To probe one possible source of this variation, we examined whether or not each token was followed by the independent pointing sign ME, which is articulated at the chest and which could have triggered lowering. Seven of the 15 tokens of ASK-1 were followed by ME. However, only three of these tokens occurred at chest height; three others occurred at the height of the lower face and one occurred at neck height. Moreover, four tokens of ASK-1 were produced at the chest, despite not being followed by ME. Thus, the presence of a subsequent point to the chest cannot fully account for the lowering of ASK-1 to neck or chest heights.

From the Internet dataset, we identified 42 first-person object verbs that we had examined in our analysis of the elicitation data. For 11 verb types, the chest is the most common height; for 7 verb types, the lower face is the most common height. The full results, presented in Table 10, are largely consistent with the results from the elicitation task. The height value of the two tokens of CALL-BY-PHONE-1 is the lower face; the cheek is their final location. In the elicitation task, for LOOK-AT-1, the most common height value is the lower face ($n = 7$), with two tokens at the upper face. In the Internet dataset, the most common height value is the upper face ($n = 14$), followed by the lower face ($n = 2$) and

Table 10: Height values for first-person object verbs in the Internet data.

Height of production for first-person object verb forms	VERB-1
Whole face	FILM-1 (6/6)
Upper face	LOOK-AT-1 (14/17)
Lower face	ASK-1 (6/9)
	CALL-BY-PHONE-1 (2/2)
	INUNDATE-1 (2/2)
	LOOK-AT-1 (2/17)
	MOCK-1 (1/1)
	SAY-NO-TO-1 (3/3)
	SEND-A-1 (2/3)
	TEACH-1 (2/2)
Neck (front)	ASK-1 (3/9)
	LOOK-AT-1 (1/17)
Neck (sides)	CONVINCE-1 (1/3)
Collarbone	CONVINCE-1 (2/3)
Chest	CATCH-1 (1/1)
	CONTACT-1 (2/2)
	CRITICIZE-1 (1/1)
	FLIRT-1 (1/1)
	GIVE-1 (6/6)
	INSULT-1 (1/1)
	INUNDATE-1 (1/1)
	OFFER-1 (3/3)
	SEND-A-1 (1/3)
	1-TAKE (2/2)
	TELL-1 (6/6)
Shoulder	REMIND-1 (4/4)
Abdomen	None

the front of the neck (one token). The results on LOOK-AT-1 from the elicitation task and the Internet dataset analysis suggest that the verb is lexically specified for face height.

Two verbs, LOOK-AT-1 and SAY-NO-TO-1, have been claimed to be articulated at the signer's nose. We took a closer look at those verb forms to make more fine-grained qualitative distinctions within the height categories. Tables 11 and 12 show the height locations for these two verb forms in the elicited data and the Internet data, respectively.

Among the 9 elicited tokens of LOOK-AT-1, five were produced at the height of the signer's nose, three at the mouth, and one at the chin. Among the 17 Internet tokens of LOOK-AT-1, seven were produced at the nose as in Figure 22, while the rest were produced at different parts of the face. For SAY-NO-TO-1, 10 of 14 tokens were produced at the height of the signer's lower face, as shown in Figure 23; just four tokens appeared to be directed specifically at the signer's nose. The Internet data show that two tokens were produced at the signer's mouth and one at the signer's chin. From these data it appears that LOOK-AT-1 and SAY-NO-TO-1 are produced at various heights in the proximity of the signer's lower face, but not necessarily at the height of the signer's nose.

Table 11: Height values for LOOK-AT-1 and SAY-NO-TO-1 from the elicited data.

Elicited data		
Face part	LOOK-AT-1 (n = 9)	SAY-NO-TO-1 (n = 14)
Forehead	0	0
Eyes	0	0
Neck	0	3
Nose	5	4
Mouth	3	5
Chin	1	2
Total	9	14

Table 12: Height values for LOOK-AT-1 and SAY-NO-TO-1 from the Internet data.

Internet data		
Face part	LOOK-AT-1 (n = 17)	SAY-NO-TO-1 (n = 3)
Forehead	1	0
Eyes	5	0
Neck	0	0
Nose	7	0
Mouth	3	2
Chin	1	1
Total	17	3



Figure 22: LOOK-AT-1 produced at nose height.

Our findings show that, in general, ASL directional verbs may have one of two height values: the chest and the lower face. Our data suggest that the most frequent height value for a directional verb is the chest. Verbs show considerable variability in height, with some verbs (e.g. ASK, TEACH)—but not others (e.g. LEAVE-ALONE, VISIT)—showing lowering to the chest from the face. This suggests that the chest is the prototypical height value for different types of directional verbs.



Figure 23: SAY-NO-1 produced at mouth height.

3.5 Facing

Facing is “the direction towards which the fingertips or palm are oriented in agreement verbs, as determined by the reference points assigned to the arguments of the verb” (Meir 1998a: 7).²¹ Central to this definition is the idea that the palm and/or fingertips change, or *reverse*, orientation in order to point to the location associated with the object referent (whether first- or non-first person) of a directional verb. According to Meir (1998a; b), facing marks the syntactic arguments of the verb while the direction of path movement marks the semantic-thematic relations of the verb’s arguments. Thus, under her analysis, reversibility and directionality function as two distinct but interrelated grammatical mechanisms for verb agreement morphology.²² Verbs vary in whether they are constrained in directionality and reversibility; the blocking of the latter occurs when the citation form of the verb does not have fingertips or palm oriented toward the object.

In our elicited data, out of 95 first-person object verb forms, 40 display facing through fingertip orientation only (e.g. ASK, GIVE, LOOK-AT) and 6 display facing through palm orientation only (e.g. CATCH, FILM, TAKE).²³ 8 forms display facing through both fingertip and palm orientation (e.g. INFLUENCE, PREACH, REMIND). 36 verbs do not display facing, as a different part of the hand is oriented towards the signer: knuckles (e.g. CONTROL, TEASE), ulnar edge of the hand (e.g. CONVINCED, TEACH), or back of the dominant hand in asymmetrical two-handed signs that contact each other (e.g. CRITICIZE, OWE). Fingertip orientation appears to be the typical marker of facing in ASL, as 42% of the elicited verbs display facing this way, whereas 38% of the sampled verbs do not display facing at all.

In our Internet data, out of 25 first-person object verb forms, 13 display facing through fingertip orientation only (e.g. ASK, GIVE, LOOK-AT) and five through palm orientation only (e.g. FILM). There was no verb that displayed facing through both fingertip and palm orientation, due to the small sample of first-person object verb forms from the Internet data. We did not identify a single form in the Internet data that contradicted the elicited data; thus, the Internet data corroborate our findings on facing.

As previously mentioned, citation forms and non-first person object forms of directional verbs can look similar. While citation forms do not have facing in principle, since they

²¹ Meir adds that spatial and plain verbs do not display facing; that is, fingertip and palm orientation do not mark the arguments of these verbs.

²² The analysis in Meir (1998a; b) is primarily based on ISL data, but she makes a tentative claim that it can be applied to other signed languages including ASL.

²³ A few verbs exhibit variation in whether they display facing: #VP, E-MAIL, OFFER, and TEACH. These forms display facing with fingertip orientation in some signers and no facing in other signers. We coded these forms for both facing values.

are produced in isolation without an established object R-locus, the facing of a non-first person object verb form often does not differ substantially from the citation form (despite being directed toward an established object R-locus). In the elicited data, we did not identify unexpected facing in any non-first person object verbs; in all instances, the fingertip or palm orientation of the elicited non-first person object verb form approximated the fingertip or palm orientation of the citation form. However, we found that three first-person object verbs displayed unexpected facing, in which the facing of a first-person object form did not involve the same hand parts as the non-first person forms. These verbs are 1-INVITE, OFFER-1, and TEACH-1; see Table 13.

The verb form 1-INVITE, a backwards verb, has two variants in the elicited data. Figure 24 shows the citation form, and Figure 25 shows the non-first person object form,

Table 13: Facing values from the elicited data.

Directional verb form	Expected facing	Unexpected facing
1-INVITE ($n = 15$)	12	3
OFFER-1 ($n = 9$)	7	2
TEACH-1 ($n = 13$)	7	6



Figure 24: The citation form of INVITE at the beginning of the sign.



Figure 25: 2/3-INVITE at the beginning of its sign.

which is similar to the citation form and exhibits path movement from the source (the non-first person invitee) to the goal (the first-person inviter). In the non-first person object form, the radial side of the hand faces the object. Since articulatory constraints make it impossible for the radial side to face the object in a first-person form (while maintaining upward palm orientation), the ulnar side instead faces the object when the direction of path movement is reversed, as seen in Figure 26. The orientation of the ulnar side thus is what we would expect for 1-INVITE and thus there would be no facing under Meir's criteria. However, an alternate first-person form displays another facing that diverges from both the citation form and non-first person form: the fingertips face the object, as shown in Figure 27. We identified 3 tokens of 1-INVITE that display this facing: in those tokens, the fingertips were oriented to the object,²⁴ whereas all tokens of 2/3-INVITE had the radial side oriented to the object.

For the verb form OFFER-1, we identified two elicited tokens that did not display facing. These tokens did not have the fingertips facing the object, as we would predict based on



Figure 26: 1-INVITE as non-facing at the beginning of its sign.



Figure 27: 1-INVITE as facing at the beginning of its sign.

²⁴ In lieu of the vocabulary of facing, these three tokens of 1-INVITE can also be understood as having the fingertips as the contacting region of the hand; these tokens contacted the center of the upper chest. Six other tokens of 1-INVITE contacted the upper chest; for these tokens the ulnar edge of the hand was the contacting region.

Table 14: Facing values from the Internet data.

Directional verb form	Expected facing	Unexpected facing	No facing
OFFER-1 ($n = 3$)	2	0	1
TEACH-1 ($n = 2$)	0	2	0

the citation form, the non-first person form, and the other 7 tokens of OFFER-1. Rather the two tokens instead had the ulnar edge of the hands oriented towards the signer.²⁵ All of the OFFER-2/3 tokens from our elicitation data displayed expected facing; none did not display facing.

In the Internet data, we identified 3 tokens each of OFFER-1 and two tokens of TEACH-1; there were no tokens of 1-INVITE. Table 14 shows the results for these two verbs. There were two variants of OFFER-1; the single token of one variant displayed no facing. For TEACH-1, there was only one variant that displays unexpected facing (i.e, tips oriented to the signer).

The most clear example of facing that cannot be completely predicted from the citation form and non-first person object forms is TEACH-1. In our elicited data, there are at least two variants of TEACH-1. One variant exhibits path movement directed towards the signer; this variant does not exhibit inward fingertip orientation and thus does not have facing. Another variant exhibits reduced path movement but exhibits inward fingertip orientation. Out of 13 tokens of TEACH-1, 7 tokens exhibited path movement and only one of them incorporated inward fingertip orientation. In the elicited data, we identified 6 tokens of the second variant that exhibited fingertip orientation (and this variant also occurs in the two tokens from the Internet data). Only one participant out of 13 produced both TEACH-2/3 and TEACH-1 with the fingertips oriented toward the object; the participant who produced this form of TEACH-2/3 stated that it was an older form that has fallen out of regular use in ASL. A few other signed languages, such as German Sign Language (DGS) and Israeli Sign Language (ISL), have an identical sign for TEACH that displays facing through the fingertips for both first and non-first person forms (Meir 1998a; Mathur 2000).

In summary, facing is the orientation of the fingertips or palm so as to point to the R-locus associated with the syntactic object of the verb. In other verbs where neither the fingertips nor the palm point to the object, there is no facing. For the majority of directional verbs that exhibit facing, facing in the first-person object form can be predicted from the citation form and non-first object forms. We have identified a few verbs in which first-person verb forms diverge from their citation forms; in particular, it would seem that the first-person object form of TEACH in which the tips are oriented toward the signer must be lexically specified.

4 Discussion

We have reported data on the first- and non-first person object forms of directional verbs in ASL. Because of continuing interest in the status of first person in signed languages and because of methodological issues associated with the analysis of non-first forms, our analyses largely examine the first-person object forms. We will now suggest 1) that ASL directional verbs must be lexically specified for height in space, 2) that our results on place of articulation, facing, and (perhaps less convincingly) contact argue that certain

²⁵ The verbs INVITE and OFFER seem to be formationally identical when both exhibit the ulnar side of the hands facing the object.

first-person verb forms must be listed in the ASL lexicon, and 3) that there may be a prototypical first-person location at the center of the upper chest.

4.1 Incidence of first-person object forms

Our focus in this paper has been on the morphology of first-person object verb forms. In general, these verbs move in the opposite direction as their citation forms (the face-anchored verbs are the sole class of exceptions); most first-person object forms are therefore easy to identify. Our participants produced a first-person object verb form in 72% of 1,117 contexts; this percentage is higher than has been reported in recent corpus studies of Auslan and BSL (de Beuzeville et al. 2009; Fenlon et al. 2018). There was some individual variation, as well as variation by verb type. Some target verbs such as GIVE uniformly elicited a first-person object form from all of our participants. In contrast, verbs such as IGNORE yielded 7 first-person object forms from 15 participants and BEG yielded only one first-person object response from the 11 participants who were tested on this verb. Given our design of the elicitation task, we have no information, for example, as to whether subjects would have produced distinct directional forms marking third-person locations on the left versus right. Such information is needed to confirm that there is indeed a first-person gap in the directional paradigms of verbs like BEG.

Other verbs that have been previously claimed to lack a first-person object form—e.g. FLIRT, ENCOURAGE, KILL—yielded some first-person responses. There has been debate about whether these gaps, which have been reported for first-person forms but never for non-first forms (Liddell 2003), are due to articulatory constraints (Mathur 2000) or to lexical idiosyncrasy (Liddell 2003). What is clear is that, in the context of our elicitation procedures, some participants (but not all) can fill those gaps.

4.2 Height

Liddell (1990; 2003) observed that first-person object verb forms are produced at different heights in space. The preponderance of directional verbs that we examined were produced at chest height; this was true of all 15 elicited tokens of GIVE. However, other directional verbs were produced at face-height locations. For example, FILM and LOOK-AT were consistently produced at face height, whereas other verbs varied in their height value. TEACH was uniformly produced high in the signing space, with 3 tokens at the upper face, 9 at the lower face, and just a single token at neck height; no token was produced at chest height. SAY-NO-TO was produced at the lower face (10/14) or neck height (3), with just a single token at chest height. First-person object verbs in general have endpoints that appear to lie on or near the midline, at or near the signer. The result is that the first-person morphological pattern in ASL specifies two of three spatial coordinates (left-right and front-back), but not height (up-down). The height of the first-person verb form is lexically determined.

We did not find evidence of the fine-grained height distinctions that Liddell (1990; 2003) reported. For example, he reported that the verb SAY-NO-TO is articulated at nose height, but in our data most tokens appeared to be directed to the mouth, chin, or neck. Given the granularity of our data (or lack thereof), we would simply say that SAY-NO-TO is produced at face height. Some verbs can lower to the chest from their phonologically-specified location on the face; we elicited one token of SAY-NO-TO at the chest. The data for ASK (which Liddell found to be articulated at the height of the chin or neck) were strongly suggestive of lowering: 5 of 15 tokens were produced at the lower face, but 3 at the neck, and 7 at the chest. These examples can be interpreted as instances of the widespread lowering of ASL signs that are produced on the face. Signs such as KNOW, WHY, FATHER, and STUBBORN can lower from their phonologically specified location at

the ipsilateral side of the forehead to the ipsilateral side of the face. Lowering may be an effect of phonetic environment and/or faster signing (Russell et al. 2011; Mauk & Tyrone 2012; Tyrone & Mauk 2012).²⁶ Alternatively, the lowering of first-person object verb forms may be interpreted as the result of attraction to the default first-person location at the chest (cf. Cormier 2007).

The behavior of 1-INVITE in our data suggests that attraction to a default first-person location may indeed be an important factor. All tokens of 1-INVITE ($n = 15$) were produced at the upper chest, not the abdomen. Liddell had reported that the abdomen is the phonologically-specified location for this verb. However, the endpoints of 1-INVITE in our data completely overlapped those for GIVE-1. We did not elicit a single token whose endpoint was below the upper chest. Note that, in other settings, we have elicited 1-INVITE at the abdomen. However, these instances were elicited from signers who were standing, not seated as our participants were.

4.3 Face-anchored verbs

With respect to the form of first-person object verbs, there are two classes of verbs that are produced at face height in the signing space. The first class includes verbs such as TEACH and LOOK-AT. No token of TEACH-1 or LOOK-AT-1 made contact with the signer's body. The same is true for SAY-NO-TO-1. The 14 tokens of SAY-NO-TO-1 generally ranged in final height from the neck to the nose; a single token lowered to the center of the chest (and, like the others, that token did not make contact). The verb ASK patterned somewhat differently in our data: tokens were produced at the face (5), neck (3), and chest (7). Its final height was variable. Of those tokens produced at the chest, 5 contacted the signer's body.

The second class of verbs has initial contact at the face in their citation forms; these are what we call face-anchored verbs. Among these verbs are TELL and INFORM, which like SAY-NO-TO are verbs of communication. With the exception of a single verb, the first-person object forms of the face-anchored verbs are uniform in their behavior with respect to place of articulation. These verbs have endpoints at or near the upper chest in their first-person forms; the exception is CALL-BY-PHONE. For some of our signers, the first-person form of this verb was articulated simply by reversing the direction of movement; instead of moving away from initial contact at the side of the face the verb moved toward contact with the face. For other signers, the first-person object form of CALL-BY-PHONE behaved just like other face-anchored verbs, with final contact at the upper chest.

In sum, verbs such as TEACH-1 can show first-person marking near (but not on) the face. The variant first-person object form of one face-anchored verb, CALL-BY-PHONE, has final contact at the side of the face. However, the class of face-anchored verbs otherwise triggers first-person marking at the upper chest. This would appear to be a pattern of ASL morphology that is conditioned by the phonological shape of the unmodified verb.²⁷ Note that there is no general phonological restriction against movement to contact with the face in monomorphemic ASL signs. Examples of signs with movement toward the face are BITTER (chin), STRICT (nose), and SICK (forehead).²⁸

²⁶ Dictionary entries for KNOW and WHY can be found at <https://www.signingsavvy.com/sign/>; for FATHER and STUBBORN at <https://www.handspeak.com/>.

²⁷ The phonological shape of these anchored first-person forms is unusual in that they cross major body areas; these signs move from the head to the chest. In general mono-morphemic ASL signs do not do this (Battison 1978; Corina & Sandler 1993), although there are exceptions: BIRTHDAY, THANKSGIVING, MAN, and WOMAN. The last two signs have been considered historical compounds (Shaw & Delaporte 2015). For dictionary entries for BIRTHDAY, THANKSGIVING, MAN, and WOMAN, consult: <https://www.handspeak.com>.

²⁸ For the dictionary entries for BITTER, STRICT, and SICK, consult: <https://www.handspeak.com>.

4.4 Exceptional place of articulation and contact in first-person object verb forms

If a first-person object verb form contacts the signer’s body, it does so at the upper chest. There are three exceptions: the verbs CONVINCe, REMIND, and CALL-BY-PHONE. The variant of CALL-BY-PHONE-1 that has final contact at the side of the face is the lesser-used variant in our data. In contrast, all subjects produced first-person forms of CONVINCe and REMIND that contacted the neck and shoulder, respectively. Note again that the citation forms of CONVINCe and REMIND do not have body contact. These three first-person verb forms must be listed in the lexicon. The lexical specification of place of articulation in certain first-person directional verbs is not unique to ASL. In Danish Sign Language (DTS), Engberg-Pedersen (1993) lists COMFORT-1 as a verb form that is lexically specified to contact a body region other than the chest.

Our results on place of articulation in first-person object verb forms are summarized in Figure 28.

4.5 Achieving contact is variable

Whether or not a first-person verb form contacts the chest appears to be highly variable in our data. Moreover it can be difficult to code contact. However certain verbs—GIVE, IGNORE, INSULT, TELL—uniformly achieved contact in the first-person forms that we analyzed. It is possible that certain chest-high verbs must be lexically specified as having contact in their first-person object forms. Again, the lexical specification of contact in verbs is not specific to ASL. Engberg-Pedersen (1993) lists DECEIVE-1 as a DTS verb that is lexically specified to contact the signer’s chest as its final place of articulation.

4.6 Facing

For verbs that display facing, one part of the hand—generally the fingertips or the palm—is consistently oriented toward the spatial locus associated with the animate object. The first-person object forms of three verbs displayed unexpected facing for some signers—that is, given the citation form of these verbs, an unexpected hand part was oriented toward

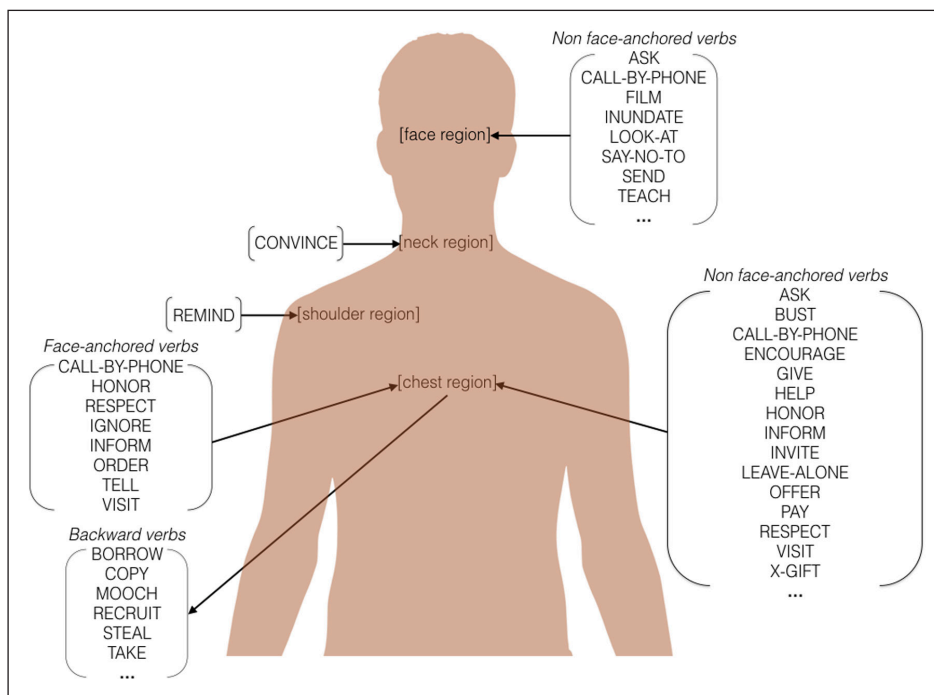


Figure 28: A schema of the final place of articulation for first-person object verb forms; for backwards verbs, this diagram represents the verb’s initial place of articulation.

the signer's chest. For 6 of 13 signers, the ulnar edge of the hand was oriented toward the spatial location associated with the non-first person object of the verb TEACH. Simply reversing the direction of the sign's movement yields a form in which the radial edge of the hand is oriented toward the signer; this was the variant for TEACH-1 produced by 6 of our participants. However, 6 participants produced a variant in which the fingertips were oriented toward the signer in TEACH-1. We raise the possibility that TEACH is not a facing verb for some signers, whereas for those signers who produce TEACH-1 with fingertips toward the signer TEACH is—at least in part of its paradigm—a facing verb.

4.7 A default first person location?

We offer evidence that the center of the chest is the unmarked or default location for first-person agreement. First-person singular pronouns, in ASL and in most other signed languages, are articulated at the center of the upper chest. First person plural pronouns may be spatially displaced to one side or the other, depending on locations associated with their referents. In an elicitation task probing ASL and BSL, Cormier (2007) found that first-person plural pronouns that one might have expected to be located on the left or right (and therefore would have been motivated in their location in space) were sometimes produced at the center of the signer's chest. She interpreted the centralization of first-person plural pronouns as evidence that the center of the chest is the default location for first-person marking.

In our data, the center of the chest is the preponderant location for first-person object agreement. Importantly, with the exception of three verbs (CONVINCE, REMIND, and CALL-BY-PHONE), the center of the chest is, in our data, the only location at which an agreeing verb can actually contact the signer's body.

Our data revealed a pattern of lowering and raising of certain first-person object verb forms to the chest. In our elicited data, some verbs that are canonically articulated at the lower face or neck may lower to the chest: 7 of 15 ASK-1 tokens (the other 5 tokens were produced at the lower face and 3 at the neck) and 7 of 15 PITY-1 tokens. One verb that may be canonically produced at the abdomen raised to the chest: 1-INVITE (Liddell 2003). However, signs may lower (and in the case of INVITE they may raise) as a consequence of linguistic and non-linguistic factors that are independent of the morphology of directional verbs. Previous studies of lowering in ASL, Auslan, and New Zealand Sign Language (NZSL) suggest that those factors include individual differences in the use of the signing space, speed of signing, phonetic environment, grammatical category, language background, and social groups based on age, sex, and socioeconomic status (Lucas et al. 2002; Schembri et al. 2009; Mauk & Tyrone 2012). It remains an empirical question if morphological factors may be attracting first-person verb forms to the center of the chest.

As we have seen, it is not just verbs that are chest high in their citation forms that have first-person locations at the chest. It is also true of one class of citation-form verbs that are articulated at face height. Table 3 in §3.2.1 shows that almost all tokens of each of the 8 face-anchored verbs—CALL-BY-PHONE, HONOR, IGNORE, INFORM, ORDER, RESPECT, TELL, and VISIT—have their final place of articulation at the signer's chest.

4.8 The growth of first-person in directional verbs

First-person pronominal signs in ASL and other signed languages would seem to have their origins in gesture. Surely first-person object forms should emerge early, but apparently this has not been the case. They have been claimed to be relatively late development in directional verbs; see Engberg-Pedersen (1993) for DTS, and Meir (2012; 2015) and Meir et al. (2013) for ISL. In DTS, older signers, aged between 50–60, tended only to produce single-agreement verbs that marked an object that was *not* first-person. Younger signers produced double-agreement verbs, including first-person object verb forms. In ISL,

first-generation signers do not modify directional verbs like GIVE and FEED and treat them as plain verbs instead. However, third-generation signers modulate these verbs as doubly-agreeing forms that are “de-anchored” from the signer’s body, e.g. SHE-GIVE-HIM. The late emergence of first-person object forms in the paradigms of directional verbs in DTS and ISL suggests that the verbs go through a grammaticalization pathway for person-marking, and that they develop first-person object later rather than sooner.

There is an exception to this diachronic trend. First, first-person object forms of GIVE have been attested in naturalistic discourse in San Juan Quiahije Chatino Sign Language (SJQCSL), a recently identified emerging indigenous sign language in rural Mexico. The language is currently in its second generation and uses topographic space for referring expressions. Hou (2016) finds that one extended family of first- and second-generation deaf and hearing signers exhibits directionality for first-person object forms of GIVE based on the real-world locations of referents, including the signer’s body.

We see three types of explanations for the generally late emergence of first-person object forms: 1) Perceptual or phonological constraints: regular, forwards verbs (such as GIVE) have movement outward from the signer’s body in their citation forms and in “singly-agreeing” directional forms that mark a second- or third-person object; backwards verbs (such as TAKE) show movement toward the body in these instances. First-person object forms move inward toward the body in regular verbs, but outward in backwards verbs. This reversed direction of movement may be perceptually disruptive; it may also be inconsistent with the phonological representations of these signs. This perceptual or phonological constraint could inhibit the emergence of first-person object forms in general. Phonological constraints could also inhibit the emergence of specific verb forms: e.g. KILL may have been specified for radial contact earlier in the history of ASL and may still be so-specified for some signers. The first-person object form that we have identified has ulnar contact. 2) Iconic constraints: the citation forms of GIVE and TAKE, as well as those directional forms that mark a second- or third-person object are mimes (Meier 1982); alternatively they can be construed as encoding “body as subject” (Meir et al. 2007). As mimes, they can be seen as enactments of an action, as if performed by the signer. “Doubly-agreeing” directional forms of GIVE and TAKE that mark subject and object can be seen as “spatial analogues” that are approximate maps or diagrams of the action being referred to (Meier 1982). Disruption of the mimetic qualities of verbs may inhibit the emergence of first-person object forms in iconic directional verbs. A singly-agreeing form such as GIVE-1 is not a mime of the referent action (instead it might be viewed as a mime of receiving) and may be only a partial map of that action. 3) Articulatory constraints: production of forms such as FLIRT-1 may be awkward or impossible, given human anatomy (Mathur & Rathmann 2001). These articulatory constraints may inhibit the emergence of first-person object forms of specific verbs. These three types of explanations may interact to yield the generally late emergence of first-person object forms in signed languages and to determine that some individual ASL verbs either lack first-person object forms to this day or display considerable variability in the form and incidence of first-person object forms.

4.9 Cross-linguistic and cross-cultural arguments regarding the status of first-person in gestures and signed languages

Differences between points to self and points to other in gestural systems may be a foundation for a linguistic difference between first and non-first reference in signed languages. Reference to self appears to be distinctive in pointing gestures (Morris 1979; McClave 2001); there are a number of lines of relevant evidence. First, eye gaze cannot support self-reference, since a signer cannot direct eye gaze toward herself, i.e., to her own body. Second, self-reference cannot be indicated through lip-pointing (Sherzer 1973; Enfield

2001) or nose-pointing (Cooperrider & Núñez 2012). Both facial gestures extend outwards, which render them more appropriate for spatial deictic orientation towards non-first person referents (among other non-pronominal referents).

Third, there are cross-cultural differences in self-reference. In contemporary Japanese culture, both hearing gesturers and deaf Japanese Sign Language (NS) users may point to their nose to indicate self-reference (Japan Sign Language Research Institute 1997). The same occurs in Plains Indian Sign Language (PISL), a lingua franca used for communication among North American Plains Indians who did not share a common language (Farnell 1995). (Note that in the literature on JSL and PISL, we have seen no mention of pointing to another person's nose for non-self reference.)

Fourth, it appears that only a minority of self-points in American hearing gesture employ a fully extended index finger, unlike non-self reference points. Cooperrider (2014) observes that self-points are seldom produced with the prototypical extended index finger handshape. In a small corpus study, he found that 90% of self-points were produced with other handshapes, of which the most common was a loosely extended hand, that is, a 'flat hand' or 'open hand' that is a variant of the B-handshape; occasionally self-points were produced with a fist or thumb. By contrast, non-self reference points more frequently employed variants of the extended index finger handshape.

The handshape variation in self-reference gestures noted by Cooperrider (2014) also occurs in pointing signs for first-person pronominal reference in ASL (Bayley et al. 2002), BSL (Fenlon et al. 2013), and Auslan (Johnston 2013a), even though the extended index finger handshape is considered the citation-form handshape for ME in each of these languages. In Bayley et al.'s ASL corpus study, about 48% of 2019 tokens of first-person pointing signs were produced in citation form. In Fenlon et al.'s BSL corpus study, only 12.4% of 370 tokens of first-person pointing signs were produced in citation form. In these corpus studies, the most common alternative form of the first-person pointing sign was some variant of the flat/open hand.

A handshape distinction between first-person and non-first person pronominal signs has been documented in other signed languages. In Kata Kolok (KK), first-person reference employs a B-handshape, while an extended index finger is used for non-first person reference (de Vos 2015). A similar case has been documented in Yolngu Sign Language (YSL), another indigenous sign language used in an aboriginal Yolngu community in Australia (Bauer 2013). A handshape distinction between first and non-first reference has also been documented in the possessive signs of two national signed languages. In Brazilian Sign Language (Libras), the B-handshape can only be used for first-person possessives whereas two other distinct forms can be used for both first-person and non-first person possessives (Pizzio et al. 2009). Similarly, in Russian Sign Language, the first-person possessive sign employs the B-handshape whereas the non-first person possessive employs the extended index finger handshape (Kimmelman 2009). These handshape differences suggest a lexicalized distinction between first- and non-first person in the pronominal systems of Libras and RSL.

Self-reference and non-self reference pattern differently in gestures, as manifested by the use of non-manual articulators (the lips and nose) for non-first person reference, the use of pointing to one's nose for self-reference, and handshape differences between self-reference and non-self reference. Some of these differences from gestures are analogous to those found in signed languages, suggesting that the grammatical categories of first-person and non-first person have their roots in gesture.²⁹

²⁹ We are not taking a definite position about whether grammatical person exists in gesture. Rather, we are pointing out some of the similarities in the expression of self-reference and non-self reference in gestural systems and signed languages. Our terminological use of *self-reference* and *non-self reference* is intended to be neutral with respect to the grammatical status of pointing gestures.

5 Conclusion

Our findings demonstrate that certain first-person object forms of directional verbs in ASL exhibit idiosyncratic properties with respect to facing, contact, and location on the signer's body that are not manifested in their citation forms. Such verb forms must be listed separately in the lexicon from verb forms with regular morphological properties. Likely they must be learned as separate patterns from regular patterns. Our findings also suggest that deviation from a directional verb's expected height may be a more general property of signs, akin to articulatory undershoot, and may not be a lexical property of the directional verb itself. Having said this, we need to understand why certain verbs in our sample did not show lowering. Future research using more naturalistic elicitation tasks as well as a larger dataset of naturally-occurring ASL data could refine our understanding of the behavior of first-person and non-first person object forms.

Our results provide further support for the grammatical status of first-person as well as a distinction between first-person and non-first person in ASL and, perhaps by extension, many other signed languages that exhibit directionality. Interestingly, in a typological study of person syncretism in spoken languages, the distinction between first-person and non-first person in the singular is more common in inflectional paradigms (subject-verb agreement) of Indo-European and Papuan languages, than it is in independent singular pronouns (Cysouw 2005). Directionality in ASL thus patterns like inflectional paradigms of some spoken languages, with a distinction between first and non-first person. The physical marking of the signer's body as first person in ASL and in other signed languages, in contrast to the arbitrary first-person verb forms of spoken languages, highlights the modality differences between signed and spoken languages. However, first-person marking is a hallmark of language, notwithstanding the modality differences between signed and spoken languages in the morphological shape of first-person.

Abbreviations

ASL = American Sign Language, Auslan = Australian Sign Language, BSL = British Sign Language, DGS = German Sign Language (*Deutsche Gebärdensprache*), DTS = Danish Sign Language (*Dansk tegnsprog*), HZJ = Croatian Sign Language (*Hrvatski Znakovni Jezik*), ISL = Israeli Sign Language, KK = Kata Kolok, Libras = Brazilian Sign Language (*Lingua de Sinais Brasileira*), NS = Japanese Sign Language (*Nihon Shuwa*), NZSL = New Zealand Sign Language, RSL = Russian Sign Language, SJQCSL = San Juan Quiahije Chatino Sign Language, YSL = Yolgnu Sign Language

Additional Files

The additional files for this article can be found as follows:

- Supplement for the stimuli used in the elicitation task for Appendix A, found on the Dataverse Project. DOI: <https://doi.org/10.7910/DVN/DKDY5H>
- **Appendix A.** Dataset from the elicitation task. DOI: <https://doi.org/10.5334/gjgl.469.s1>
- **Appendix B.** Dataset from the Internet. DOI: <https://doi.org/10.5334/gjgl.469.s1>
- **Appendix C.** Dataset from the elicitation task for height production of first-person object verb forms. DOI: <https://doi.org/10.5334/gjgl.469.s1>
- **Appendix D.** Video sources used for the Internet dataset. DOI: <https://doi.org/10.5334/gjgl.469.s1>

Ethics and Consent

The authors obtained human subjects approval for our study from the Institutional Review Board (IRB) approval of the University of Texas at Austin, Protocol Numbers 2011-09-0019 and 2013-09-0102. All the participants gave informed consent. Debbie White, the

ASL signer model, also gave verbal consent for us to storing video stimuli at the Dataverse Project for public view. The first author also informed some of the signers in the video sources used for the Internet data about our study and received their verbal consent; however, she was unable to reach other signers.

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Competing Interests

The authors have no competing interests to declare.

Author Contributions

The first author created the stimuli for the elicitation task, and collected, coded, and analyzed all of the data reported in the paper, and contributed a significant amount to the text. The second author reviewed the data analysis and the text closely, and also contributed to the text.

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