SignStream™ Annotation:

Conventions used for the American Sign Language Linguistic Research Project

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ASLLRP Annotation Schema - version 2.5

Introduction

♦ Background about the SignStream™ project

SignStream™ is a multimedia database tool designed to assist in the transcription and analysis of video-based language data. SignStream version 2 is a MacOS application that is distributed on a non-profit basis to researchers, educators, and students. Information about the program is available at `http://www.bu.edu/asllrp/SignStream/`; see also Neidle (in press-a). A Java implementation of SignStream, which will have many new features, is currently underway.

A substantial amount of data from native signers of American Sign Language (ASL) has been collected in conjunction with the National Center for Sign Language and Gesture Resources: `http://www.bu.edu/asllrp/cslgr/`. The video data, which include multiple synchronized high-quality views of the signing from different perspectives and a close-up of the face, along with the SignStream annotations thereof, are being made publicly available.

The data are available as SignStream files or in text export format (described in Appendix D). This report is intended to explain the conventions that are being used for the annotation of these data.

♦ Acknowledgments

Many people have contributed to this project in different ways. This document incorporates direct contributions of David Greenfield (the principal programmer for SignStream versions 1 and 2) and Dawn MacLaughlin (who participated actively in the design of the program and who wrote much of the SignStream documentation). In addition, Ben Bahan's assistance, input, and feedback over the years have been invaluable. The design of the program and the decisions about annotation have also benefited from the work, suggestions, and ideas contributed by Mike Schlang, Robert G. Lee, Fran Conlin, Sarah Fish, Lana Cook, Erica Hruby, Carla DaSilva, Ginger Leon, Norma Bowers Tourangeau, Judith Labath, Diane Brentari, Jack Hoza, Sue Duncan, Judy Kegl, Patricia Trowbridge, Barbara Eger, Tamara Neuberger, and others. We are also grateful for discussions and e-mail exchanges with those who have been using SignStream.

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♦ Annotation schemes in relation to SignStream

The conventions in use by the American Sign Language Linguistic Research Project have evolved somewhat as we have been transcribing data from native signers of American Sign Language. The conventions described here reflect the annotation conventions we have used for

transcription of data collected since 2000 in the National Center for Sign Language and Gesture Resources. We will refer to the set of conventions detailed in this document as *the ASLLRP Annotation Schema version 2.5.*

Although this is generally consistent with earlier transcription by our group, some changes have emerged. The general principles, however, are consistent with those outlined in the SignStream User Guide (MacLaughlin, Neidle and Greenfield, 2000), available from the SignStream Web site. Relevant sections of that guide are reproduced here, with appropriate modifications. In addition, we discuss here some of the challenges we have faced and the decisions we have made (which have often involved particular trade-offs).

One of the advantages offered by the program is that it facilitates the development of annotation schemes. SignStream provides a set of fields and values specifically designed for annotation of ASL data, and users may edit those fields and values. This particular capability will be further refined in the next version of the program, and there will be additional types of data supported by SignStream version 3.

Some of the conventions that we have adopted were motivated by limitations in the ways available to us for transcription of the data. It is likely that our conventions will continue to evolve, as our linguistic understanding deepens and as the tools available for annotation become more sophisticated. We expect, therefore, to update this document periodically.

♦ Purpose of this document

This report is intended to assist in interpreting the annotations contained in the coded data we distribute. It is also intended to assist those who wish to adopt these conventions.

We discuss the considerations that led us to make particular choices. Different circumstances, annotation tools, and linguistic interests could very well lead others to make different choices. We hope, at least, that raising these issues may help others to arrive at their own coding decisions.

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Basic Principles

♦ **General caveats about the annotated data that we distribute**

Incomplete information

For various reasons, it is sometimes impossible to determine all of the behaviors that we would like to annotate from the video images. Some aspects of the signing may be obscured or caught between the frames of the video.

Incomplete transcriptions

Transcriptions are partial. We have not attempted to transcribe absolutely everything that is happening. We have had to make judgments about which details to transcribe. The motivations for many of those decisions are discussed in this document, but in many cases, one could make a case for doing things differently. Our choices have inevitably been shaped, in part, by limitations in our knowledge, tools available for transcription, and our particular linguistic focus. We hope at least to make explicit here many of the choices that we have made and the reasons behind them.

Imperfect translations

The English translations are not intended to capture the full meaning of the ASL sentences. They are intended only to give a general idea of the content of what was signed.

Ambiguity

There is often some degree of ambiguity with respect to what has been signed. In such situations, we have chosen *one* reading and provided annotations and translation for that reading. We have not attempted to account for all possible interpretations of each sentence.

Human error

The transcriptions have been carried out and verified by several independent annotators, including Deaf native ASL signers. Nonetheless, it is certain that some errors remain. We hope to release updated versions of the annotations (with distinct version numbers), incorporating corrections that come to our attention.

♦ Left and right

The terms 'left' and 'right' are used consistently to reflect the signer's perspective.

♦ Gloss fields

Use of English glosses

There are obvious limitations in using English glossing. Ideally, we would like to be able to encode the phonological and morphological characteristics of signing. To that end, we are designing intuitive and efficient tools for this purpose as part of SignStream version 3.

In the interim, however, we are using conventional English glossing to allow us to identify the signs that are produced and to define their start and end points. The glossing conventions that we have used, as well as the annotations for non-manual behaviors described later, are generally based on the notation systems used in C. Baker and D. Cokely (1980) and Smith, Lentz, and Mikos (1988). The notations are intended to be descriptive, rather than to express particular theoretical beliefs. For example, we have annotated 1st, 2nd, and 3rd person reference, despite the fact that questions have been raised about whether the distinction between 2nd and 3rd person is grammatically significant in ASL (Meier, 1990).

Start and end points

For purposes of identifying the start and end points of manual signs, we have consulted with native signers about their intuitions. As a result, we have not counted anticipatory movements—while the hands get into the appropriate position to begin to articulate the sign in question—as part of that sign. Similarly, we have identified the end point of the sign as occurring *prior* to movement of the hands out of the position for that sign in preparation for articulation of the following sign. We have, however, transcribed situations in which the final position of the sign is held for some time as 'holds'. It is also worth noting that in the smooth transitions that frequently occur between signs, it is not always obvious where one sign ends and the next begins.

Dominant and non-dominant hand fields

We have used the 'dominant hand gloss field' for most of the information about manual signing. We have made use of the 'non-dominant hand gloss field' only for information about what is happening on the non-dominant hand that is not predictable. This is discussed in more detail in the next section.

Ideally, it would be nice to have complete information about the activities of both hands in the two gloss fields. However, this would be time-consuming to transcribe within SignStream

version 2. Tools to facilitate efficient annotation of this kind will be incorporated in SignStream version 3.

♦ Non-manual fields

Distinction between anatomical descriptions and linguistic interpretation

Our goal has been to describe the behaviors objectively, in as theory-neutral a fashion as possible. For this purpose, we have made use of anatomical fields to identify the specific physical movements. For example, there is a head movement field within which a side-to-side headshake can be annotated. We have set up independent fields for grammatical interpretive information. So, in the situation where a headshake corresponds to a non-manual expression of negation, we have also encoded this behavior within a grammatical negation field. This results in some degree of redundancy, but we believe that it is useful to be able to access both types of information. We have sometimes chosen to display the grammatical interpretive fields in red, so that they are easily visible.

Start and end points

We have used 's' (for 'start') to annotate movements that are anticipatory, and that precede the linguistically significant portion of the non-manual behavior. Similarly 'e' (for 'end') is used for non-manual behaviors that follow a non-manual gesture, as the articulators return to neutral position.

Despite our attempt to separate description from interpretation of behaviors, we felt it important to annotate these gestures in this way, so as not to obscure the very general linguistic patterns we have discovered. For example, with respect to periodic head movements (nods and shakes), we have found that there is an anticipatory movement of the head (either up or to the side) so that the movement can begin with maximum 'thrust' and the longest possible arc. Based on these empirical findings, we have annotated the anticipatory movement as 's' and have identified the start point of the head gesture as occurring with the following downward or sideward movement. Similarly, with raised eyebrows, we have found that the eyebrows go from neutral position to raised position over several frames (at 30 frames per second), and then the maximal position is maintained over the relevant phrase. We have similarly encoded the anticipatory movement as 's' and identified the raised eyebrow position as beginning once the eyebrows have reached their maximal height. We have also coded as 'e' the transition back to neutral position (although this often begins a few frames before the end of the phrase over which the raised eyebrows occur). So, the principle we have followed for consistency in the coding of eyebrow movements is to annotate the domain over which the eyebrows are at a maximal position (whether raised or lowered) and to annotate as 's' or 'e' transition gestures.

One of the difficulties in annotating non-manual transitions as 's' and 'e' is that in the case where, for example, there is a transition from a raised eyebrow position to a lowered eyebrow position, there is no visible boundary between the 'e' portion of the raised eyebrows and the 's' portion of the lowered eyebrows. We made an arbitrary decision to encode the entire transition, in such cases, as 's' (anticipatory of the following gesture).

♦ Problems and limitations

Representation of intensity

There are some obvious limitations in this system of annotation. It is very difficult to represent differences in intensity. We have attempted to convey some information about intensity of gestures by using the '+' and '−' signs to indicate the degree of a behavior. However, this is impressionistic and does not allow for a description of gradual changes in intensity.

Periodic movements of the head

With respect specifically to head nods or shakes, we are also not able to encode easily the amplitude of head turns or nods, nor the rapidity of the repetitions. We have attempted to encode some of this information in the names we have assigned to specific field values, such as 'single head nod' or 'rapid head nod.' Ideally, there are other representations of this data that would be more useful, such as graphical displays of head position. We hope that collaborative research now in progress with computer scientists (e.g., Neidle, Sclaroff, and Athitsos, 2001) may eventually lead to semi-automation of aspects of the transcription that would allow computer-based generation of such displays.

The exact end points of such periodic movements can also be difficult to identify with precision, since these nods and shakes generally diminish in intensity and amplitude until they damp out.

Manual Material

♦ **English-based glosses**

General conventions

We have attempted to use standard conventions for the nearest English equivalent to a given ASL sign. This English word is written in capital letters.

Capital letters	WORD	English word used to represent an ASL sign.
–	OH-I-SEE THANK-YOU	Used to separate words if the English translation of a single sign requires more than one.
/	BOLD/TOUGH WOW/AWFUL	Used when one sign has two different English equivalents.

Challenges and difficulties

Conventions do not always exist and may not allow for necessary linguistic distinctions.

On occasion, however, we have encountered a sign for which there is no conventional gloss known to us (or to those with whom we have consulted). In such cases, we have done the best we can to find a reasonable gloss. This includes signs that have not been described previously in the literature. For example, we have identified an indefinite focus particle that has not been previously analyzed as such. In the glosses, we identified this sign as '**part:indef**'.

We have sometimes made a conscious decision to deviate from the standard glossing conventions to express a distinction that has not been commonly reflected in gloss systems. These conventions will be documented **later**.

Examples:

Signs made with the index finger

We have differentiated the glossing of signs produced with the index finger based on their function as determiner, pronominals, or adverbials.

Tense markers

We have identified tense markers in ASL and have sought a consistency in labeling them that has not been present in other systems of transcription.

There may exist conflicting conventions.

In cases where there are differing conventions, we have had to make a choice.

Examples:

There is a sign that has sometimes been glossed **UP-TO-NOW** and sometimes as **SINCE**. In the interest of uniformity, we have glossed all occurrences as **UP-TO-NOW**.

Attempt at consistency

We have attempted to be consistent in using a single correspondence between ASL sign and English gloss throughout our transcriptions. This is not always easy, because, as in the previous example, the meaning of a given sign (and therefore the English gloss that may seem most natural) may be different in different contexts. In other cases, there may be two close variants in ASL that would be roughly translated by the same English word. Where the two signs differ in handshape, we have marked the handshape (in parentheses at the beginning of the gloss) to distinguish the variants.

Another difficulty is the situation where the best English correspondence is ambiguous in English. In such cases, one way to distinguish the different readings is to number them, as in 'GLOSS(1)' vs. GLOSS(2)'. Below follows an explanation of some distinctions we have made in glossing.

BREAK-DOWN vs. ENGINE-FALL-OUT

The sign **BREAK-DOWN** is a symmetrical two-handed sign. **ENGINE-FALL-OUT** is the gloss used for a sign that involves the non-dominant hand facing palm downward; the dominant hand in an S handshape (representing the engine) starts out under the non-dominant hand , against the palm, and then drops.

FIND/FIND-OUT

Since in some contexts this sign is best translated as 'find' and in others as 'find out', we have glossed all occurrences of the sign in this way. (Note that we use a different gloss for the sign **FIND^#OUT**, which is sometimes synonymous with **FIND/FIND-OUT**).

GIVE vs. GIFT

We use **GIVE** to represent the verb made with the flat-O handshape. **GIFT** uses the X handshape (but is also a verb, despite the fact that 'gift' in English is a noun).

NOT-LIKE vs. (Y)NOT-LIKE

The latter sign, articulated with the Y handshape, is used colloquially by some signers to indicate that they don't care for something. The movement begins with the thumb at the nose, palm facing basically downward. The wrist then twists outward (lowering the thumb) as the hand moves down and away from the body. Distinguished from the sign conventionally glossed as **NOT-LIKE** and that glossed as **NOT-CARE**.

part:indef

An indefinite focus particle articulated with a single outward movement of one or both palms (facing upward), as shown in Figure 1. (See Conlin, Hagstrom, and Neidle, in press.)

REALLY

We have used this gloss not only for the adjective and adverb signs made with the index finger starting at the mouth and moving downwards (meaning 'real,' 'really,' 'true,' or 'truly'), but also for a discourse marker used by some signers.

REFUSE

This is how we have chosen to gloss the sign sometimes glossed as **WON'T**.

SEE vs. SEE-SEE

Both signs use the V handshape and the middle finger touching the cheek just below the eye. **SEE** is the transitive verb describing visual perception; the hand extends in an outward movement from the eye. **SEE-SEE** involves short pathlength and two brief contacts made by the middle finger under the eye. The meaning is more figurative, as in 'we'll *see* what will happen'.

Figure 1. The indefinite particle (part:indef)

SINK vs. SCL:3"vehicle sink" vs. SCL:B"boat sink"

We have distinguished signs translated as 'sink' in English in this way, based on whether a classifier is involved (and if so, which one).

SOMETHING/ONE

A sign in ASL that may be translated as either 'something' or 'someone'. It is also used as an indefinite determiner. This is a shorthand way of representing **SOMETHING/SOMEONE**.

SWITCH

This is the sign made with the L handshape that is used to indicate a switch to another person's turn or, more generally, to something different.

VOMIT

This gloss is used for the verb as well as for the adjective meaning 'disgusting.' Since the manual forms are the same, the same gloss was used, for consistency.

> **"WHAT"**
>
> A wh-sign produced with both hands extended, palms facing up, moving slightly from side to side. Distinguished from #**WHAT** and **'WHAT'** (articulated with the index finger brushing against the open palm of the non-dominant hand).
>
> **(Y)WHY vs. (25)WHY vs. (25>Y)WHY**
>
> Since the sign meaning 'why' can involve a Y handshape, a 25 handshape, or a transition between the two, we have differentiated those signs as indicated.

Lexical markers of tense and aspectual information

We have identified the following manual signs conveying tense and/or aspectual information:

PAST	(related to the adverb **BEFORE**)
RECENT-PAST	(articulated with the X handshape touching the cheek, accompanied by the cheek-to-shoulder non-manual expression)
FORMERLY	(articulated with an open-B handshape (B-L) circling backward twice near the head)
#**EX**	(meaning: habitual past, as with English 'used to')
UP-TO-NOW	(sometimes glossed elsewhere as **SINCE**)
NOW	(which we have glossed elsewhere as immediate present, **IMMED-PRES**)
FUTURE	(sometimes glossed elsewhere as **WILL**)

See Neidle et al. *(2000, p. 77)* for further details.   Here we make a further distinction between signs used as future tense markers that has not been made previously (to our knowledge). In addition to the sign glossed as **FUTURE**, which is articulated with 5 or open-B handshape (the

fingers may be together or spread apart), there is a very similar sign articulated with an L handshape. We have glossed that as follows:

(L)FUTURE   (similar to **FUTURE** but articulated with L handshape)

In some cases, there are morphologically related adverbials. Adverbials have been distinguished from tense markers by the part of speech tags. In general, the adverbials display variable pathlength while the tense markers are frozen forms, with fixed pathlength; see Aarons, Bahan, Kegl, and Neidle (1995) and Neidle et al. (2000).

♦ Fingerspelling

Fingerspelling is used primarily for borrowings and proper names. In such cases, the signer spells out the letters (sometimes with some omissions). Some of these fingerspelled words have been incorporated into ASL as loan signs. The notations used in the two cases are illustrated here:

fs-	fs-JOHN	Fingerspelled word.
#	#CAR #EARLY	Fingerspelled loan sign.

Occasionally, to focus the addressee's attention on the fingerspelling, the signer will point, with the other hand to the hand that is doing the fingerspelling. See for further discussion.
Sometimes, only part of a word is fingerspelled. In that case, we annotate this as follows:

fs-UN+PREDICTABLE	Fingerspelled prefix followed by ASL sign.

♦ Name signs

Name signs, used for names of people or places (e.g., Cape Cod, Boston), are marked in the following way.

ns-	ns-LINCOLN ns-CAPE-COD	Name sign for 'Lincoln' or 'Cape Cod' being used.

♦ **Signs that are held**

We have annotated signs in which the final position is held for some time.

`|-->`	fs-JOHN|-->	Hold sign. Used to represent a hand position that is held at the end of a sign. For example, after fingerspelling 'John' the signer may hold the final position (in this case, the N handshape). This same diacritic can be used to indicate perseveration of the non-dominant hand.

SignStream currently does not provide a way to encode holds at the beginning of a sign. This is an omission to be remedied in the next version of the program.

♦ **Contractions and compounds**

GLOSS^GLOSS	WILL^NOT	Contraction.
+	MOTHER+FATHER	Compound.

♦ **Emphatic articulation**

!!	!MUST!	Indicates stressed articulation, for emphasis.

♦ **Repetition, reduplication**

+	DIFFERENT++ GO+	Indicates repetition (reduplication) of a sign. The number of + signs indicates the number of repetitions.

In the examples above, the sign DIFFERENT is articulated a total of three times, and the sign GO is articulated twice.

♦ **Actions**

( )	(nod) (shake head) (draws shape)	Words in ( ) indicate an action or movement made without a sign, sometimes with linguistic meaning.

♦ **Phonological issues**

In general, we have not been encoding phonological aspects of a sign, such as finger wiggling. It is represented (by convention) in the gloss we use for the yes-no question sign, as shown here:

QMwg	Question marking sign (with wiggling, as shown in Figure 2)

Figure 2. QMwg (yes-no question sign with wiggling)

We have also used 'wg' to differentiate **MOTHER** from **MOTHERwg**. We have done this because there are some signers who use these two signs differently. The same convention is used for the sign **FATHER**.

MOTHER
> The open 5-handshape is used. The thumb touches the chin.

MOTHER+
> Same as above, but the thumb touches the chin twice.

MOTHERwg
> The same handshape is used, and the same point of contact with the chin. However the thumb remains in contact with the chin and the other 4 fingers wiggle.

♦ **Fields for the dominant and non-dominant hands**

Signs produced with one hand or two

Normally, our SignStream glosses do not reflect whether the sign is 1-handed or 2-handed. However, if a 2-handed sign is produced with a single hand, or if a 1-handed sign is produced with both hands, this is annotated as indicated in the chart below. In addition, we mark 2-handed signs produced with alternating movements if the sign is normally produced without this alternation.

(2h)GLOSS	(2h)#DO++	Used when a sign that is commonly 1-handed is made with both hands.
(2h)alt.GLOSS	(2h)alt.GUESS	The notation 'alt.' indicates that both hands move in an alternating manner.
(1h)GLOSS	(1h)LOVE	Used when a sign that is commonly 2-handed is made with one hand.

Use of the two gloss fields

Since the non-dominant hand behavior can usually be predicted based on the gloss in the primary gloss field (for those who know which signs in ASL are normally produced with 1 or 2 hands), with the addition of the type of information provided in the chart above, we generally do not include explicit information in the non-dominant hand field. We use the non-dominant hand gloss field to indicate only manual behavior on the non-dominant hand that is not predictable in this sense. This can occur in a number of different circumstances:

The start or end point of a 2-handed sign is different for the dominant and non-dominant hand.

In such situations, the gloss information is repeated in both gloss fields so that different start or end points can be assigned.

Sometimes one hand (often the non-dominant hand) may hold the position of the sign while the other hand produces different signs. The following example shows a sentence in which the wh-sign **WHO** starts on the dominant hand at the same time that the non-dominant hand begins articulating the indefinite particle. That particle is held on the non-dominant. Meanwhile, on the non-dominant hand, the wh-sign **WHO** morphs into the indefinite particle sign and the two hands complete that sign simultaneously.

```
(1)   JOHN   LOVE   WHO^part:indef              [dominant hand track]

                    part:indef|-->             [non-dominant hand track]
```

In some cases, the non-dominant hand may start out as active, then hold a position for some time. This has been referred to as perseveration. It may become active again, as in the following example:

```
(2)   "WHAT"   JOHN   BUY   "WHAT"             [dominant hand track]

      "WHAT"---------------"WHAT"              [non-dominant hand track]
```

The two hands may be somewhat independent.

Sometimes the signing proceeds in parallel on the two hands, and the two hands produce independent signing. In such cases, both tracks are used for the independent glosses.

Plans for next version of SignStream

Clearly, this is not the optimal way to represent activity on the two hands! The next version of SignStream will provide tools to facilitate the efficient entry of relevant phonological information for both hands. The user will specify whether a given sign is 1-handed or 2-handed, as well as certain basic properties of two-handed signs, so that the activity of both hands can be properly represented in a rapid and intuitive way. The transcriber will also encode which is normally the dominant hand for a given signer and indicate when the signer reverses the dominance.

◆ Reference, agreement, and locatives

Subject and object verb agreement

The spatial locations used for referential and locative purposes are frequently assigned unique indexes that are indicated as subscripts in conventional glossing. For example, an agreeing verb such as **GIVE** would be begin its articulation in the point in space associated with the subject referent (call that location 'i') and would finish its articulation in the location associated with the object referent (call that location 'j'). Since 1st and 2nd person are explicitly marked, verb agreement markings are presumed to be singular 3rd person unless otherwise specified. (As mentioned earlier, 2nd person is being used descriptively to designate the addressee; the notation should not be interpreted as suggesting a significant grammatical distinction between 2nd and 3rd persons in ASL.) Whereas this might ordinarily be glossed as $_i$GIVE$_j$, we have separated the spatial index from the rest of the sign by colons.

i:GLOSS:j	i:GIVE:j	'i' and 'j' designate unique spatial locations associated with the subject and object referents.
	1p:GIVE:2p	'(I) give (you)… '

Although linguists frequently indicate coreferentiality by using matching subscripted indexes of this kind, we have *not* used indexes with any signs produced in neutral space. Therefore, if the subject of the verb **GIVE** were **fs-JOHN**, an index would only be used with this noun if it were signed in a non-neutral spatial location. Thus, we have the distinction between the following two situations:

Noun	fs-JOHN i:GIVE:j	John is signed in a neutral location.
Noun:i	fs-JOHN:i i:GIVE:j	John is signed in the location associated with the referent (the same location with which the verb displays manual subject-verb agreement).

Agreement marking on adjectives, nouns, pronouns, determiners, possessives, and emphatic reflexives

This same notation is used to mark manual agreement on other types of nominal and adjectival signs. For example, agreement is marked on the possessive sign (**POSS**) and on

pronouns and determiners. In these situations, however, person distinctions are also relevant. There is a fundamental distinction between 1st and non-1st person in ASL. Although it has been argued that 2nd person is not a significant linguistic category, we have used this gloss descriptively in cases where the referent is the addressee(s). Therefore, the notations used with singular pronouns, definite determiners, emphatic reflexives, and possessives are as follows:

Pronoun IX-[person]:i **Determiner** IX-3p:i **Possessive** POSS-[person]:i **Emphatic reflexive** SELF-[person]:i	IX-1p POSS-1p SELF-1p	1st person pronoun 1st person possessive marker 1st person emphatic reflexive marker (as in 'I did it *myself.*').
	IX-2p POSS-2p SELF-2p	Pronoun referring to addressee. Possessive marker referring to addressee. Emphatic reflexive marker referring to addressee.
	IX-3p:i POSS-3p:i SELF-3p:i	Pronoun or determiner referring to singular third person referent associated with location 'i'. Possessive marker referring to singular third person referent associated with location 'i'. Emphatic reflexive marker referring to a singular third person referent associated with location 'i'.

The third person singular pronoun may also be articulated with the thumb rather than the index finger. In such cases, we have annotate the sign as follows:

	THUMB-IX-3p:i	Pronoun referring to singular third person referent associated with location 'i' articulated with the thumb.

Adverbials of location and direction

Despite the similarity in articulation between the use of the index finger as a pronoun or determiner and as an adverbial, we have glossed the adverbial usage differently, marking only location (since person reference is irrelevant). Locations or directions may also be described by a phrase within quotation marks.

	IX-loc:j	Adverbial produced with index finger pointing to location 'j'.
Adverbial IX-loc:[location] IX-dir:[direction]	IX-loc"under table" IX-dir"around the corner to the right" IX-loc"far" THUMB-IX-loc"behind"	Adverbial with location described.

Singular vs. plural

For pronouns and possessives, grammatical number (sg. vs. pl.) is also important. See, e.g., MacLaughlin, Neidle, Bahan, and Lee (2000). One way to express plural agreement is by using multiple points in space (two or more). The sign then moves among the relevant points.

When multiple points in space are used referentially, the plural pronoun would be translated into English as something like 'the two of us' or 'the three of them.' In such cases, we included a marking of plurality followed by a specification of the numeral (incorporated into the sign) and a specification of the points in space (i, j, k, etc.). That is because these same points may be used throughout the discourse with the same referential interpretation. Examples follow:

	IX-3p-pl-2:x/y IX-3p-pl-3:x/y/z	Third person pronoun referring to the 2 (or 3) referents: x, y (and z).
IX-[person]-[numeral]:i/j/k POSS-[person]-[numeral]:i/j/k	IX-1p-pl-2:x	First person pronoun referring to signer plus the referent associated with the location 'x'.
	IX-2p-pl-3:x,y	Second person pronoun referring to addressee plus the two referents associated with locations 'x' and 'y'.

An alternative way to express plurality is through use of an arc rather than a point. This is annotated as follows both for pronouns and for other manual markings of agreement:

-3p-pl-arc	IX-3p-pl-arc POSS-3p-pl-arc SELF-3p-pl-arc 1p:GIVE-3p-pl-arc	Pronoun (or possessive or emphatic reflexive) referring to singular third person referent associated with location 'i' articulated with the thumb. 'I give (it) to them.' Subject agreement is 1st person. Object agreement (the end point of the sign) is plural (an arc).

Adverbials articulated by may also designate locations using an arc. These have been annotated in the following way:

-loc-arc	IX-loc-arc	Adverbial ('there') using an arc to designate locations.

Further distinctions in the manifestation of subject and object verb agreement

There are additional distinctions relevant to subject and object verb agreement that are discussed in Bahan (1996), Neidle et al. (2000), and MacLaughlin et al. (2000), including those described below.

Distinction between overt and neutral subject agreement

Verbs that normally display overt spatial subject agreement may instead be signed with a neutral agreement marking (similar to 1st person). In such cases, we have used 'neu' instead of the index identifying the subject reference.

neu:GLOSS	JOHN neu:GIVE:j MARY	'John gave (it) to Mary' without overt spatial subject agreement on GIVE.
	JOHN i:GIVE:j MARY	The same sentence as above, *with* overt spatial subject agreement on GIVE.

Distinction between definite and indefinite object agreement

In general, object agreement with a definite object makes reference to a point in space, while indefinite reference makes use of a wider region of space (see MacLaughlin 1997). For some

verbs, when the object is indefinite, a different form of the verb is used, as is the case with **GIVE**. We mark such indefinite object agreement as 'indef':

GLOSS-indef	JOHN i:GIVE-indef SOMETHING/ONE	'John gave (it) to someone.'
	JOHN i:GIVE:j MARY	'John gave (it) to Mary.'

Non-manual markings of agreement and location

This same use of indexes is possible with non-manual behaviors. For example, an eye gaze to the same location, designated by the index 'i' would be glossed in the logical way. Eye gaze also reflects a distinction between definite agreement (eye gaze to a point) and indefinite agreement (eye gaze extending over a region, either accomplished by 'wandering eye gaze' or an unfocused stare). The same conventions would apply as well to head tilt, which (as shown by Bahan 1996), can also mark agreement non-manually.

Non-manual:i	eg:i eg: "under table"	Eye gaze (or any other non-manual behavior) pointing to the location, indicated by the index 'i' or other description.
	eg:indef	Eye gaze showing agreement with an indefinite NP, as described above.

♦ **Aspectual information**

Perfect aspect expressed by the sign FINISH

The lexical item glossed as **FINISH** has many different functions in ASL. Among other uses, it can function as a main verb or as a perfect aspect marker. The sign is consistently glossed as **FINISH** with differences reflected in the Part of Speech tag and in the English translation. (There are instances of ambiguity in the use of **FINISH** in an isolated sentence; as previously mentioned, we have annotated one reading and have not identified all possible readings of ambiguous sentences.)

Reduplicative aspect marking

Many aspectual inflections are expressed through various kinds of reduplications. There are two possibilities for annotating this inflection:

| GLOSS-aspect | STUDY-continuative | Aspectual inflections are indicated following the gloss. |
| GLOSS++ | READ+++ | This reflects the reduplication. |

We have tended to indicate simple reduplications with the + signs, and more complex aspectual inflections by identifying the aspectual information conveyed.

Aspectual information precedes agreement information (including person and number) , if present:

| GLOSS-aspect(:i) | 1p:GIVE-distributive-3p-pl-arc
GIFT-distributive:i | '(I) gave each (of them)… '<br>'(they) each gave (one person)… ' |

This kind of aspect marking is not restricted to verbs. For example, it can also be found on the sign ONE: ONE-distributive-pl-arc (in a context where someone gave one to each of many people).

♦ **Reciprocal inflection**

The reciprocal inflection (described, for example, in Klima and Bellugi, 1979, p. 279) involves each hand articulating the verb as if it were the dominant hand, with the two hands moving simultaneously. This may involve a single movement, or it may be further inflected for aspect (e.g., there may be repeated articulations with the two hands alternating). In such cases, we mark the verb as reciprocal and indicate other inflectional information afterward, in the standard way.

| GLOSS-recip | LOOK-AT-recip:i,j | 'The referents associated with locations 'i' and 'j' look at each other.' |
| GLOSS-recip++ | (2h)alt.GIVE-recip+++:i,j | 'The referents associated with locations 'i' and 'j' are involved in multiple acts of giving to each other.' The two hands move repeatedly in an elliptical path, starting at locations 'i' and 'j'. |

♦ **Classifiers**

We follow standard conventions in identifying the specific type of classifier by abbreviations such as those included in the excerpt from Smith, Lentz, and Mikos, 1988, p. xv) contained in Figure 3. We have followed these general conventions (although without the use of italics).

Symbol	Explanation
DCL"___"	*Descriptive classifier* sign used to describe an object or a person. What is described is italicized and in quotation marks (i.e., DCL"*curly hair*"). Sometimes referred to as size and shape specifiers or SASSes.
LCL:__ "___"	*Locative classifier* sign representing an object in a specific place (and sometimes indicating movement). Handshape is given, followed by spatial or locative information italicized and in quotation marks (i.e., LCL:B"*leaf drifting to the ground*").
SCL:__ "___"	*Semantic classifier* sign representing a category of nouns such as vehicle or person. Handshape is given, followed by information about specific movement italicized and in quotation marks (i.e., SCL:1"*person walking stiffly and hurriedly*").
BCL"___"	*Body classifier* sign in which the body "enacts" the verb of the sentence. Role shifting is usually required. Specific action is described in italics and quotation marks (i.e., BCL "*acting macho*", "BCL "*put arms around friend*").
ICL"___"	*Instrument classifier* sign in which part of the body (usually the hands) manipulates an object (i.e., ICL"*driving*", ICL"*playing jacks*").
BPCL:__ "___"	*Bodypart classifier* sign representing a specific part of the body doing the action. Handshape is often indicated and specific action is described in quotation marks (i.e., (2h)BPCL:1"*crossing legs*", (2h)BPCL:B"*taps foot*").
PCL:__ "___"	*Plural classifier* sign, indicating either specific number or non-specific number (i.e., PCL:3"*people walking*", PCL:4"*long line of people*", PCL:5"*hordes of*").

Figure 3. Symbols for Classifiers from **Signing Naturally**

[classifier type]: (handshape)"___ "	DCL"curly hair" ICL"turn crank" LCL:B"leaf drifting to the ground" (2h)BPCL:1"crossing legs" SCL:1"person walking stiffly and hurriedly" PCL:3"people walking"	Classifiers

Classifiers may also be marked for agreement or location, as follows:

(i:)[classifier type]: (handshape)"___ "(:j)	j:PCL:1"person approaching":k	Classifiers

♦ **Gestures**

Quotation marks are also used to describe gestures. Information about handshape may also be included immediately before the material within quotation marks.

(handshape)"___ "	"wave no" "wave left" (2h)5wg"after a while"	Gesture-like sign.

One specific type of gesture that we have observed and annotated is the use of the non-dominant hand to focus attention on the fingerspelling being carried out by the dominant hand. This has been glossed as follows, as it uses an H handshape:

[handshape]"focus"	B"focus"	Use of one hand (often a G, B, or H handshape) to draw attention to fingerspelling by the other hand.

There is another sign/gesture that involves wiggling of the fingers. We have glossed this discourse marker as follows:

	"um"	A sign/gestures, involving wiggling of the fingers, used as a discourse marker to retain the attention of the addressee. (See Figure 4.)

Other gestures that we have identified include those glossed as follows:

	5"doesn't matter" 5"so, all set"	Both articulated with a 5 handshape. See Figure 4 for illustrations.

"um" (with fingers wiggling)   5"doesn't matter"   5"so, all set"
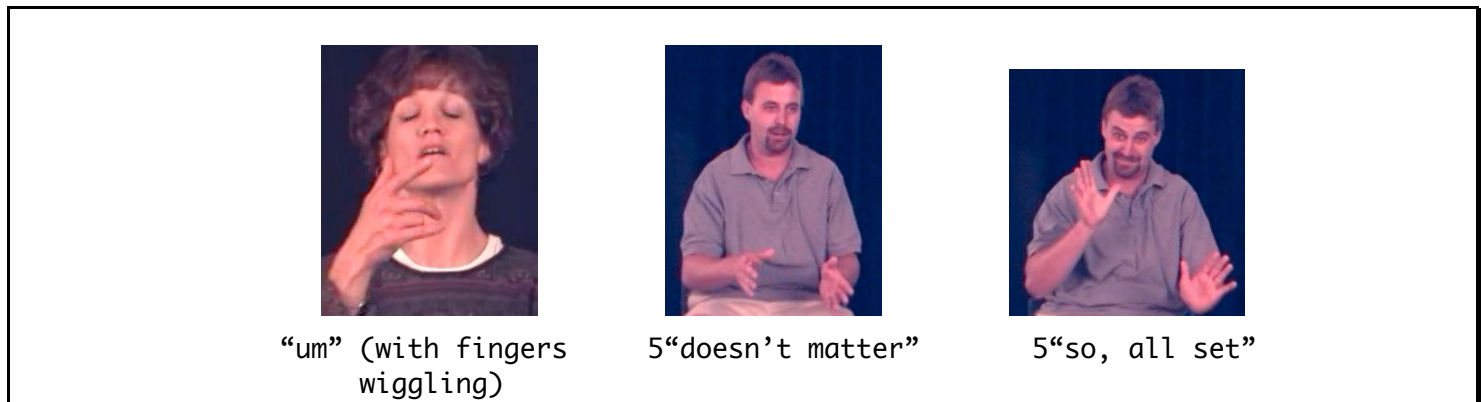
Figure 4. Some common gestures illustrated

The question of which signs are and are not gestural is a complex one, and our notations are intended to be descriptive, leaving open possibilities for future analysis of these signs. Nevertheless, given the conventions we are adopting, we have been forced to explicitly identify gestures. (For discussion of some of the relevant issues, see Emmorey(1999), although we do not always reach the same conclusions about the status of specific signs/gestures.)

Non-manual behaviors from an anatomical perspective

♦ Head position and movements

In order to allow for coding of the complex motions in which the head may engage, SignStream includes 8 fields for head behavior: 4 head <u>position</u> fields, for cases where the head is held in a non-neutral position, and 4 head <u>movement</u> fields, for continuous (potentially repeated) movements. The movement and position fields are organized in parallel fashion, such that each field captures motion along a particular dimension. For example, the head may move along one of the three axes schematized in the diagrams below.
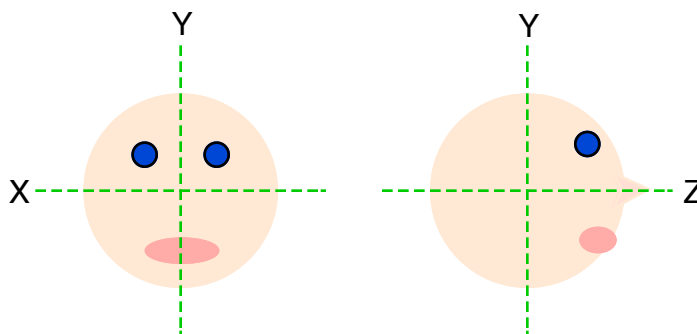
Thus, we can identify movements of the head that involve rotation with respect to these axes. When the head shakes or assumes a turned position, it is rotating around the Y axis. When the head tilts forward or backward, nods, or assumes a raised or lowered position, it is rotating around the X axis. When the head moves side to side, it is moving around the Z axis. In addition, the head may be displaced by movement of its base, that is, the neck. In this way, the head (or chin) may jut forward, for example. There are two fields, a position field and a movement field, for capturing each of these four types of displacement. It can be difficult for the transcriber to separate out (and code independently) the positions or movements along the three axes, but that is what we have done. The availability of synchronized digital video showing signing from different angles has greatly facilitated these annotations.

Fields for head position

For the head position fields, the head first moves to a target position and then maintains that position. We have generally transcribed the movement portion as 'start', and the held portion as some particular value (left, right, etc.).

head pos: tilt fr/bk (hp: tilt fr/bk)   [X axis]
    front
    back

head pos: turn (hp: turn)   [Y axis]
    left
    right

head pos: tilt side (hp: tilt side)   [Z axis]
    left
    right

head pos: jut (hp: jut)   [base]
    forward (for)
    back (back)

Fields for head movement

    The head movement fields generally describe repetitive head movements. We have labeled the anticipatory movement upward (for a nod) or sideward (for a shake) as 'start'. The head movement itself is considered to begin with the first major downward or sideward movement from that position. See for discussion of the determination of the linguistic start point for these periodic movements.

head mvmt: nod (hm: nod)   [X axis]
    rapid
    slow
    single

head mvmt: shake (hm: shake)   [Y axis]
    rapid
    slow
    single

head mvmt: side to side (hm: side<->side)   [Z axis]
    rapid
    slow

head mvmt: jut (hm: jut)   [base]

Use of plus and minus signs

    With respect to head positions, the '+' and '−' signs indicate the degree to which the head is in the labeled direction. So, +for the head position turn field, '+right' indicates that the head is

turned further to the right than the 'right' label. A turn that is not quite as much to the right as 'right' would be labeled '-right'. This is illustrated in Figure 7.

In contrast, for movements, the '+' and '−' signs are used to indicate the degree of the movement (of the labeled type). So, a head nod that is labeled as '−rapid' indicates that there is a slight head nod, which is rapid. A head nod that is labeled as '+single' is a particularly pronounced (single) head nod.

Illustrations of head positions

The least transparent of these labels is 'jut', which refers to whether the chin is pulled or tucked in (=back) or stuck out (=front), as shown in Figure 5.

jut: back   jut: forward

Figure 5. Head position: jut

Figure 6. Head position: tilt

Figure 7.   Head position: turn

Figure 8.   Head position: front/back

♦ **Eye gaze**

The direction of eye gaze may be indicated by direction (right, left, up, down, etc.), as shown in Figure 9.
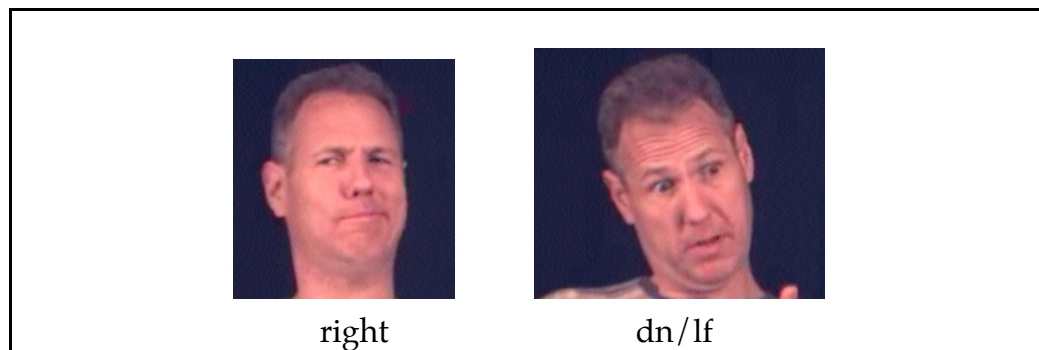
Figure 9. Eye gaze annotated to indicate direction

Another label marks eye gaze that follows the hands (track-hands), such as may occur with classifier constructions. It is also possible to code eye gaze to a specific location, as discussed on

In the next version of SignStream, we hope to have better tools to describe spatial locations used generally for reference and gaze.

♦ Eye aperture

Blinks

By convention, we code the start of a blink as the moment when the eyes close. In practice, however, that may occur in between two frames; so it may be necessary to have the start point as coded actually slightly prior to the blink. The blink is over when the eye is open again. For longer periods when the eye remains closed, we label the eyes as 'closed' (cl).

Squint vs. lowered lids

We have coded differing degrees of squinting, with the basic squint coded as 'sq' and the '+' and '−' signs used to indicated greater and lesser degrees of squinting. There are also cases where the eyelid is lowered (i.e., the eye is partially closed), but the other muscle tensing associated with squinting is absent. This has been coded as a lowered lid, 'low'. These variations are illustrated in Figure 10.
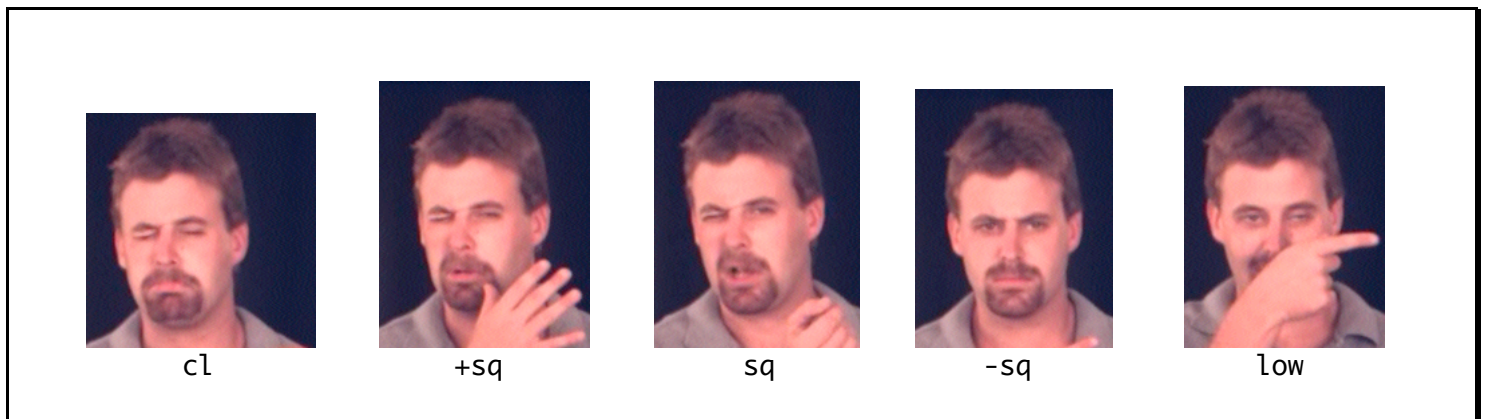
Figure 10.   Eye aperture: degrees of closure

Wide eyes

Similarly, we have labeled as 'wide' the situations in which the eyes are open more widely than usual. Again, the '+' and '− ' signs are used to indicate the degree of aperture. Wide eyes are illustrated in Figure 11.
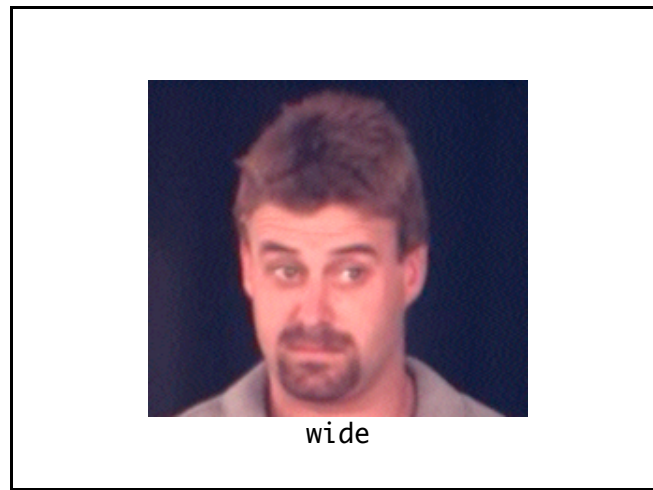
Figure 11. Eye aperture: wide eyes

♦ Eyebrow position and movements

Start and end points

As discussed earlier, the eyebrow position is defined to extend over the domain when it is maximally raised or lowered. The frames of transition from neutral position are labeled as 's' for 'start' and the frames over which the eyebrows return to neutral position are labeled as 'e' for 'end'.

Degrees of deviation from neutral

To differentiate between degrees of eyebrow height, the '+' and '−' signs are used. This is somewhat impressionistic, and not well suited to describing gradual changes in eyebrow position, but this is the system of annotation we have used. Differences of degree in eyebrow height are illustrated in Figure 12.
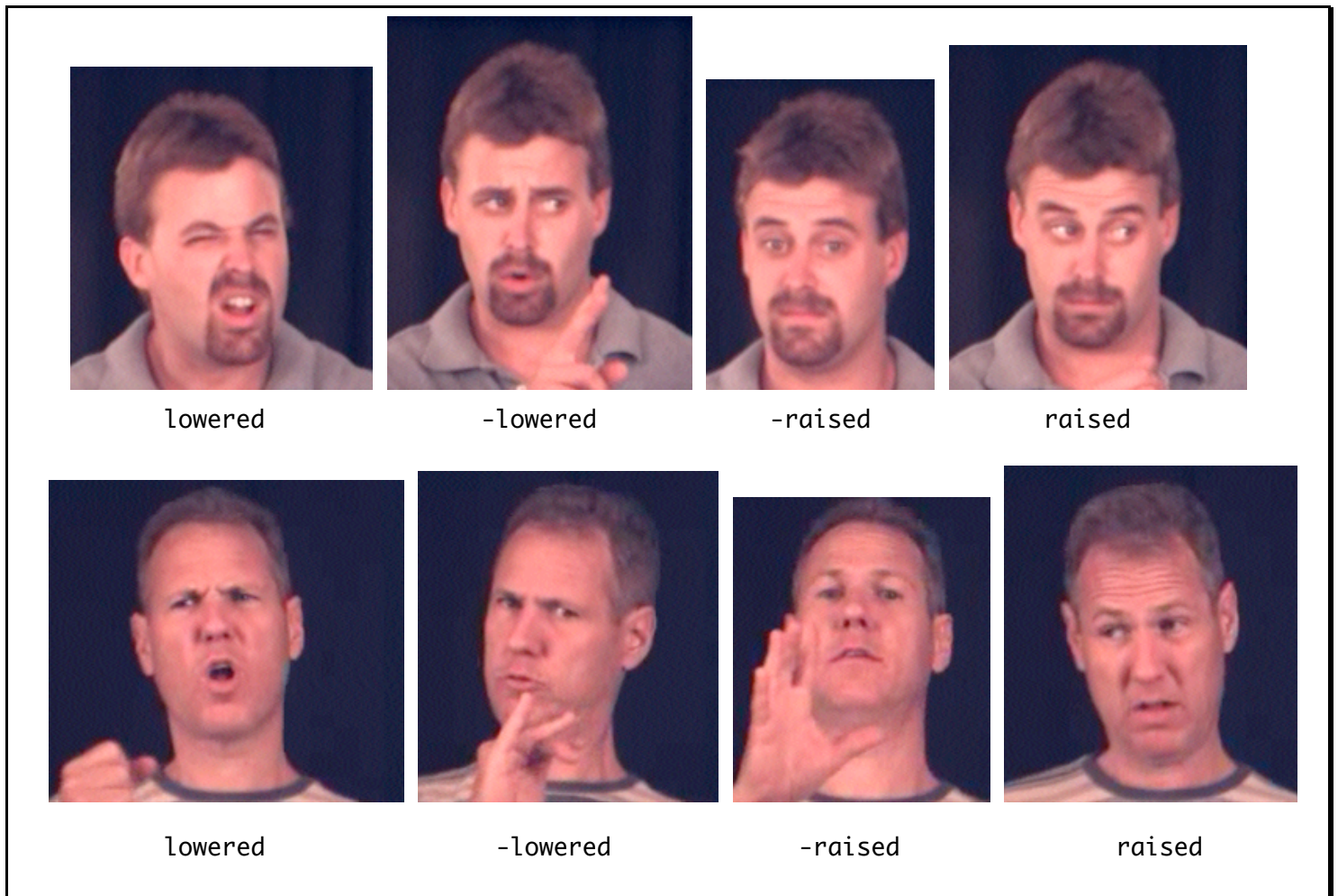
Figure 12. Degrees of eyebrow height

♦ **Mouth movements**

Illustrations

This section will provide illustrations of the mouth gestures. These are perhaps the most difficult to understand from the annotation labels. Some gestures involving the mouth being open are illustrated in Figure 13.

Mouth open, tongue visible
(otv)

Tongue between the teeth
(th)

Smile mouth open
(open-smile)

Mouth open & tense
(open/tns)

Marking of intensity
(int)
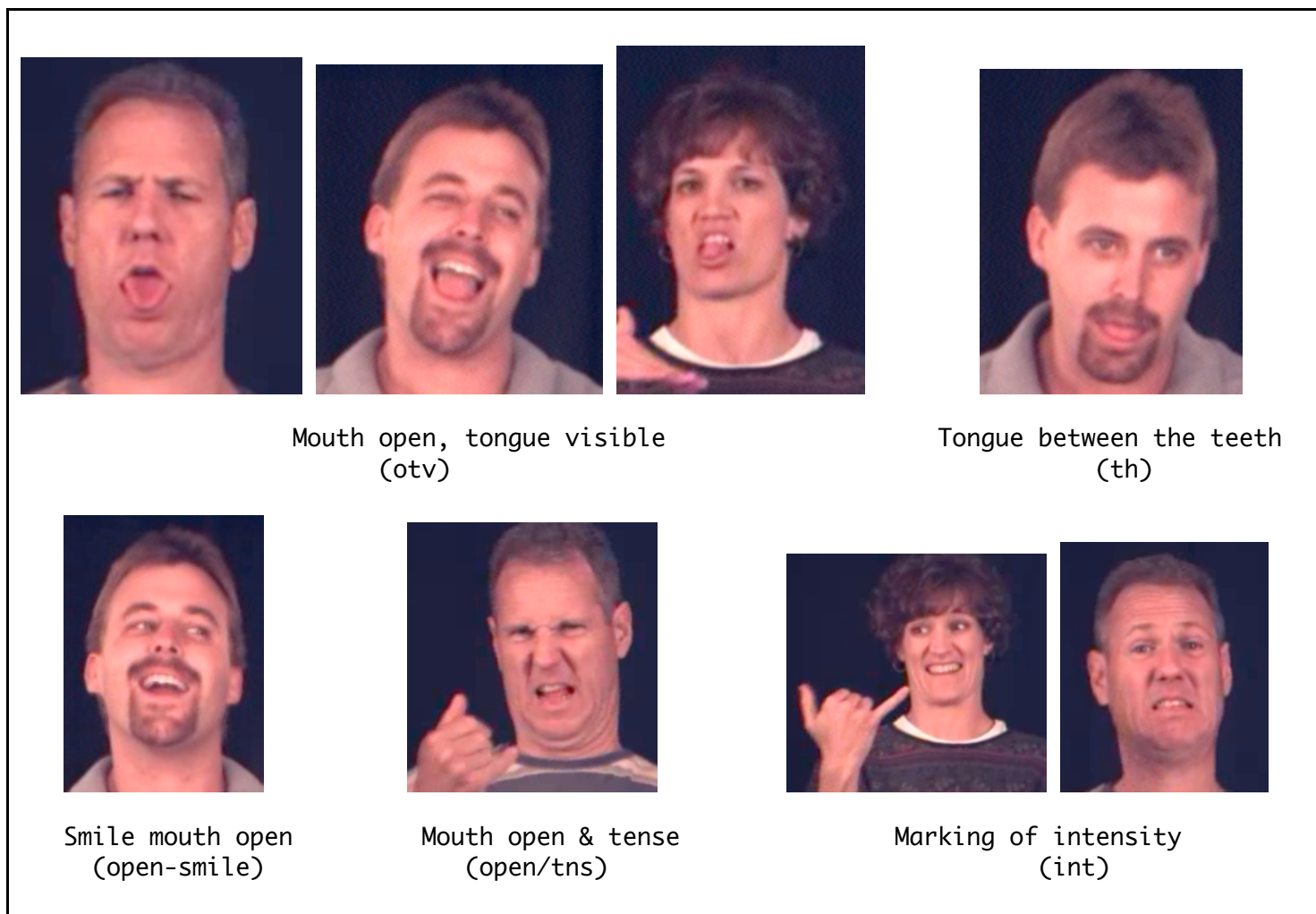
Figure 13.   Some gestures with open mouth

Figure 14 illustrates two mouth gestures that involve puffed cheeks and air being expelled.

Blow (bl)   Brr (brr)
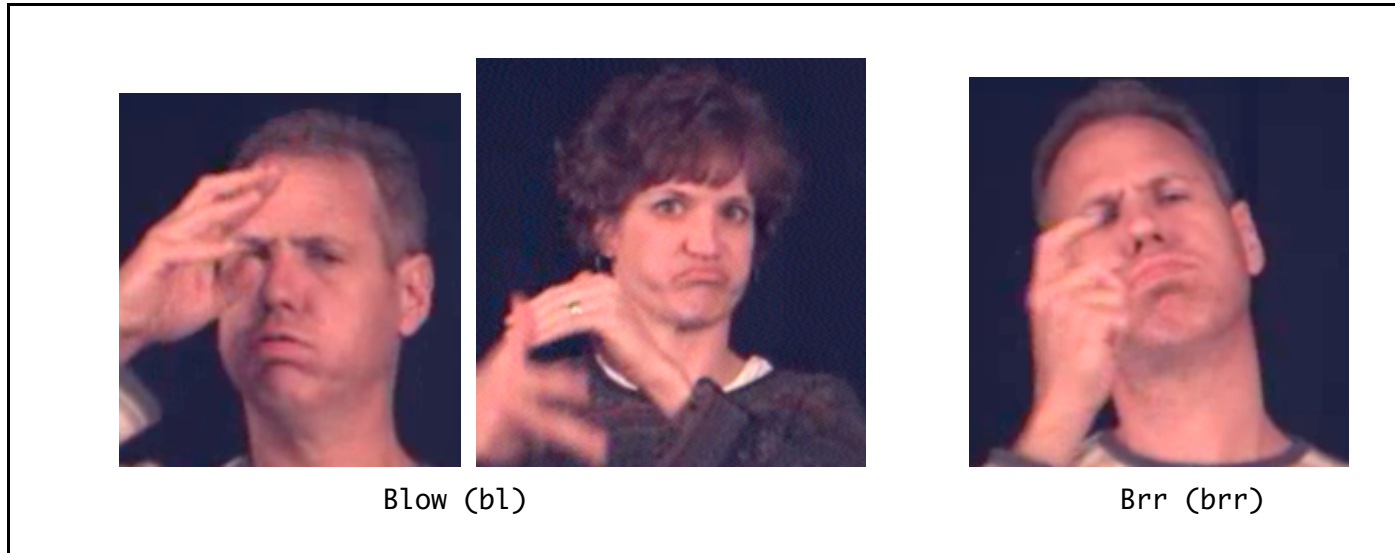
Figure 14. Mouth gestures involving release of air

One important gesture is frequently labeled 'cs' (cheek-to-shoulder). This indicates proximity in space or time, among other things. This is shown in Figure 15.

(cs)
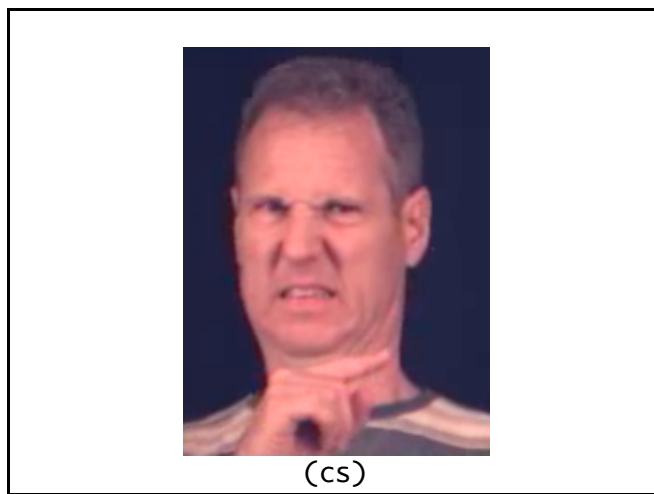
Figure 15.   Cheek to shoulder

Several mouth gestures involve the lips pressed together; some are shown in Figure 16.
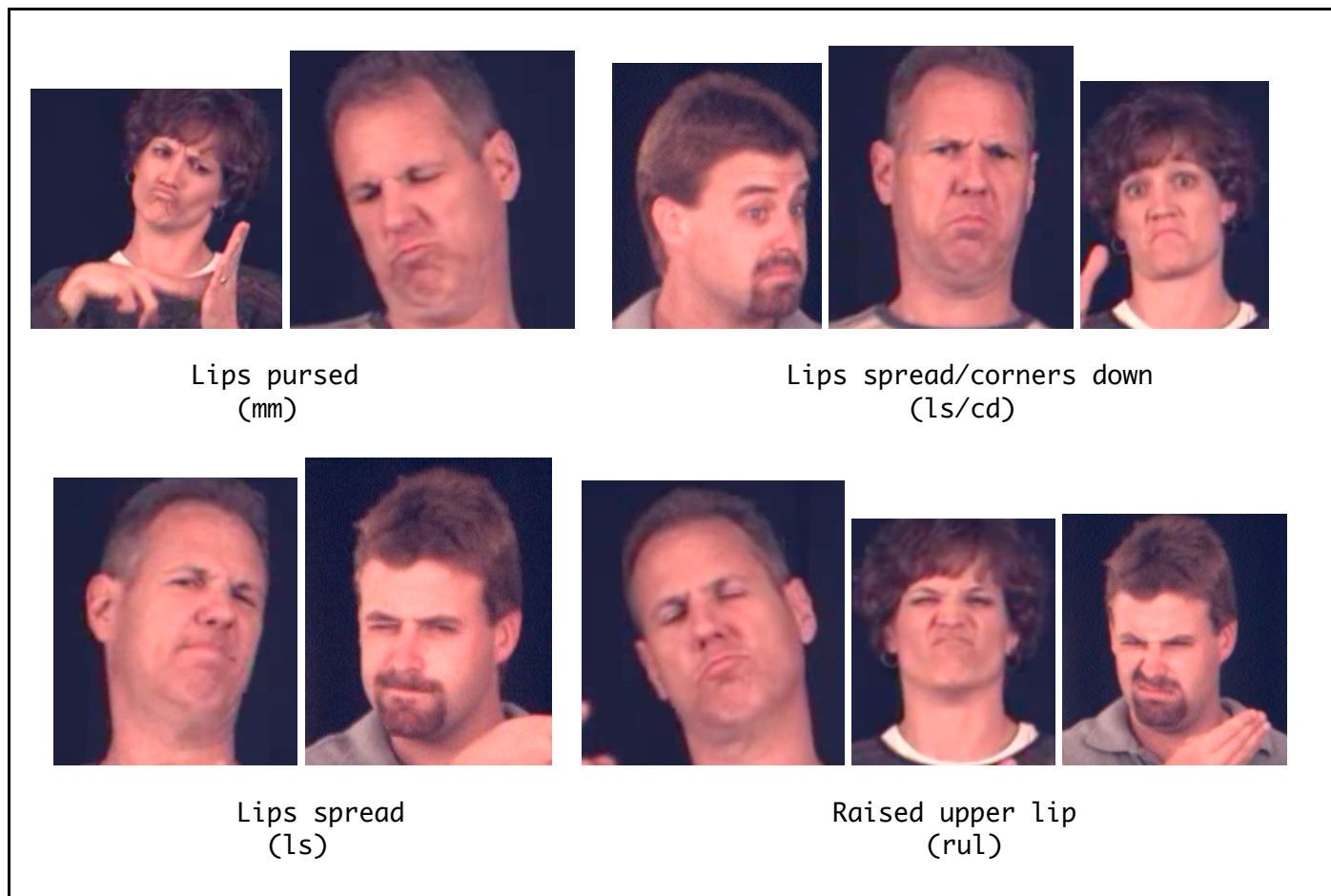
Figure 16. Some mouth gestures with lips pressed together

For discussion of the description and meaning of such gestures, see, for example, Baker and Cokely (1980).

Mouthing based on spoken language

We have not transcribed English-like mouth gestures that accompany many ASL signs. To that extent, these transcriptions are incomplete. Ideally, a notation should be used to represent in some kind of 'phonetic' fashion this kind of mouth gesture. Unfortunately, SignStream version 2 does not have the ability to use symbol fonts. Once this is possible (in SignStream version 3, we hope), such mouthing gestures should be annotated.

One difficulty, however, is that these oral language-based mouthing gestures often co-occur with adverbial ASL mouth movements, and in the transcription we have done, it has sometimes been difficult to determine what kind of mouth gesture(s) were involved. To the extent that we were able to separate out English-based mouth gestures, those were excluded from the annotations.

♦ Cheeks

Some of the mouth gestures just discussed also involve characteristic gestures of the cheeks, such as puffed or tense cheeks. This is also annotated. In some cases with mouth or cheek gestures, there is a asymmetry. If so, we specify whether the gesture occurs primarily on the right or left side, as in the 'puffed cheek right' gesture shown in Figure 17.
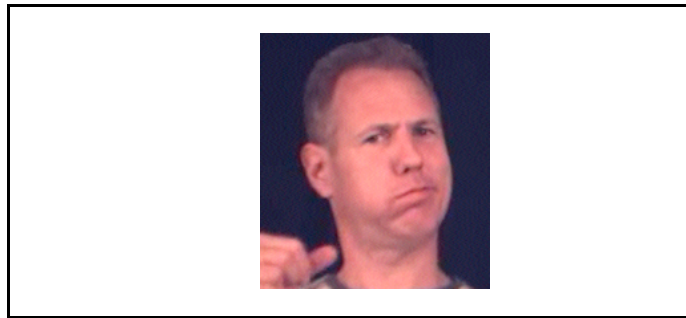
Figure 17 . Puffed cheek right (cheek: puf/rt)

♦ Nose

There is a particular wrinkling of the nose that indicates definite reference or specificity. This also frequently co-occurs with certain mouth gestures (such as 'cs'). As illustrated in Figure 18, this is distinct from what we have coded as tense ('tns').
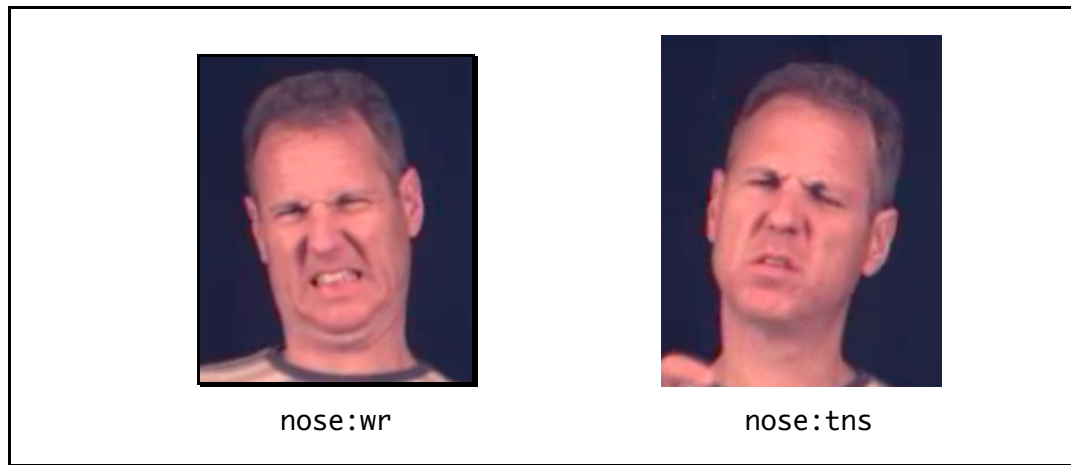
Figure 18. Wrinkled vs. tensed nose

♦ **Neck**

   We have also identified linguistically significant tensing of the neck—sometimes only on one side—as illustrated here:

Figure 19. Tensing of the neck

♦ **Body movements**

   Body leans and shoulder movements have been coded. The labels should be self-evident; for the list of values, see Appendix A.

Grammatical interpretive fields

♦ Identifying start and end points

As has been observed (Baker-Shenk 1983, e.g.), the non-manual expression associated with a particular grammatical marking tends to consist of a cluster of behaviors, with some variability. In some cases, the start and end points of the separate components are not identical. Thus, the transcriber must exercise judgment in deciding on the start and end points of the grammatical marking, guided by the distribution of the components. In general, this has been straightforward.

♦ Topics/focus

Distinctions

Although topics have traditionally been viewed as of a type, in fact, there are several linguistically significant distinctions to be made, in terms of non-manual expression, discourse function, and syntactic distribution. For more information about this, see Aarons (1994), Neidle et al. (2000), and Neidle (in press-b).

The most fundamental distinction is between moved phrases that are in focus (often contrastive focus), which we have labeled as 'foc/top1', and base-generated phrases that occur with a (potentially overt) resumptive pronoun. This is illustrated by the following examples sentences:

```
          foc/top1
 (3)   BAGEL    fs-JOHN  LIKE
       'Bagels John likes.'           (but he is not crazy about cream cheese).


            top2
 (4)  VEGETABLE   fs-JOHN   PREFER   CORN
       'As for vegetables, John prefers corn.'


            top2
 (5)  fs-MARY   fs-JOHN   LOVE   IX-3p:i
       'As for Mary, John loves her.'
```

The non-manual distinctions between the two are subtle. Generally, both types of topics are accompanied by raised eyebrows and wide eyes, for topic1, the head is tilted slightly back.

Topic2 normally involves larger backward head movement and a head nod over the topic , as well as a larger prosodic break. Illustrations of these types of topics are provided in Figure 20.

| foc/top1 | top2 |
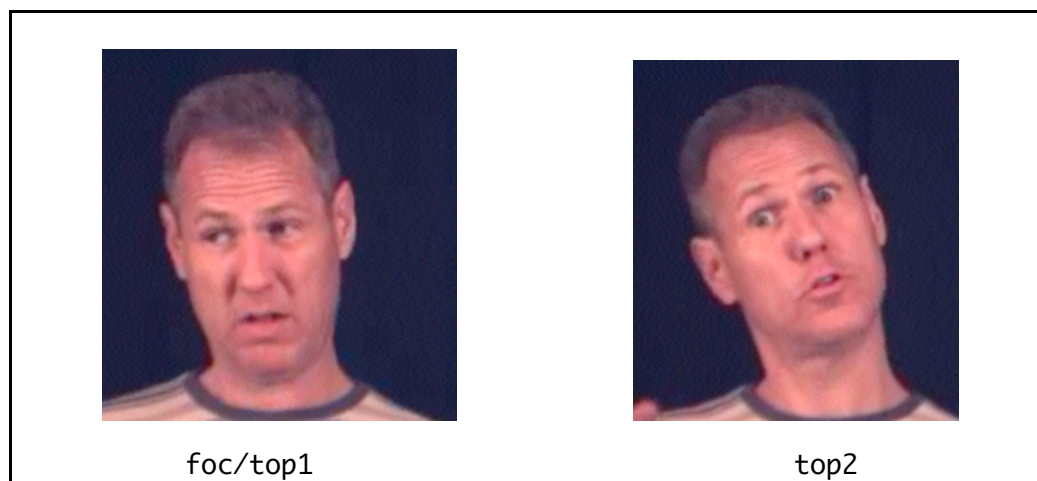
Figure 20. Topics

New label: `foc/ref`

There are, however, some uses of a non-manual expression very similar to what accompanies top1 that seems to serve a related function: that of establishing a background with reference to which the rest of the proposition is situated. This is, for example, the case, with comparisons such as occurs in example (6). We have classified this as 'foc/ref' indicating that it represents background information and *possibly* (but not necessarily) contrast.

```
                   foc/ref                      neg
 (6) TEACHER LIKE MOVIE   BUT  STUDENT   NOT

     'The teacher likes movies, but the students don't.'
```

The expression shown in Figure 21 illustrates the non-manual expression found with the first clause of the above sentence. Although this is not a topic in the traditional sense, we have included this label in the same category as top1 because of the similarity in function and expression.

It is quite possible that the non-manual marking associated with conditional and 'when' clauses as well as relative clauses—discussed in the next two sections—is actually an instance of this same type of non-manual expression, as first suggested by Coulter (1978, 1979), inasmuch

as the conditional or when clause sets up the backdrop for the proposition that follows. Nonetheless we have retained the traditional labels for those constructions.
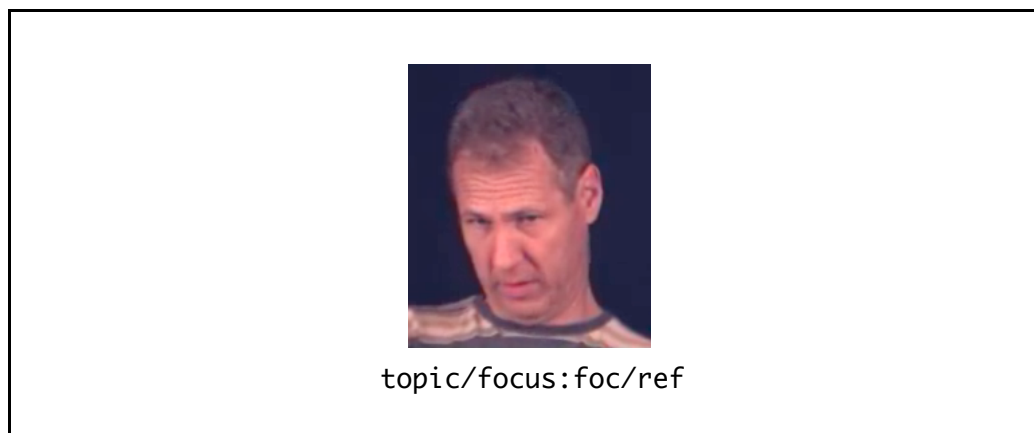
Figure 21.   Eyebrow raise indicating background information and possibly contrast

New label: `foc/adv`

In addition, we have used a different notation for sentence-initial adverbs that are accompanied by very similar non-manual markings.

Left peripheral elements

Note that this field currently provides labels for only a subset of constituents that appear in the left periphery. Conditional/When clauses and Relative clauses (discussed next) also have similar function, distribution, and non-manual markings, as the varieties of focus phrases discussed here and labeled within the Topic/focus field.

New label: `foc`

Sometimes this same non-manual marking indicates focus within IP. In such cases, the in situ focus phrases that occur with this marking (including raised eyebrows) have been labeled as 'foc'. We have included this category within the Topic/focus field as well.

♦ **Conditional/When**

Traditionally, it has been claimed (Coulter, 1979, e.g.) that the non-manual marking associated with 'when' clauses and with conditional 'if' clauses is the same as the topic (focus) marking just described. This may be true.   At the very least, the two markings are extraordinarily similar, although native signers seem able to distinguish between the

conditional and when clauses based solely on the non-manual expression (with eye gaze perhaps being key). This is a subject for future research, but for the time being, we have annotated the non-manual expressions of conditional and when clauses as distinct. These are illustrated in Figure 22.

conditional   'when' marking

Figure 22.   Conditional and 'when' marking

♦ **Relative Clauses**

So-called relative clauses in ASL (correlatives) most often occur in sentence-initial position with non-manual marking very similar to what is found with top1 (see, e.g., Coulter 1979 and Neidle, in press-b). In addition, they are frequently accompanied by the nose wrinkle that Coulter identified as being associated with definite descriptions and which seems to function more generally as a marker of specificity. This is illustrated in Figure 23.
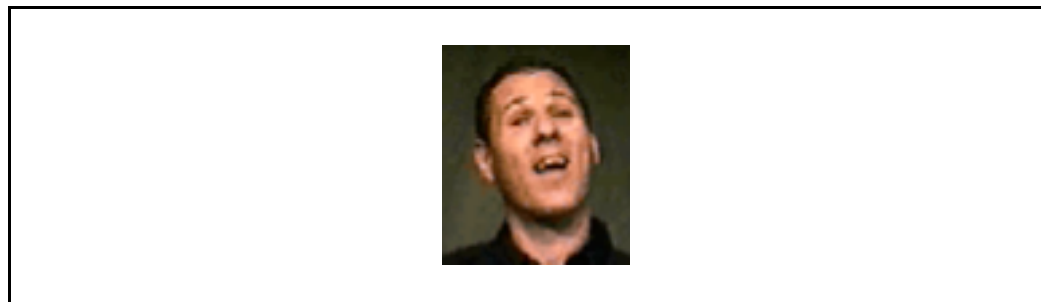
Figure 23. Relative clause facial expression

♦ **Questions**

The non-manual markings characteristic of direct and rhetorical wh-questions and yes-no questions are illustrated in Figure 24 and Figure 25.

yes-no question marking   wh-question marking
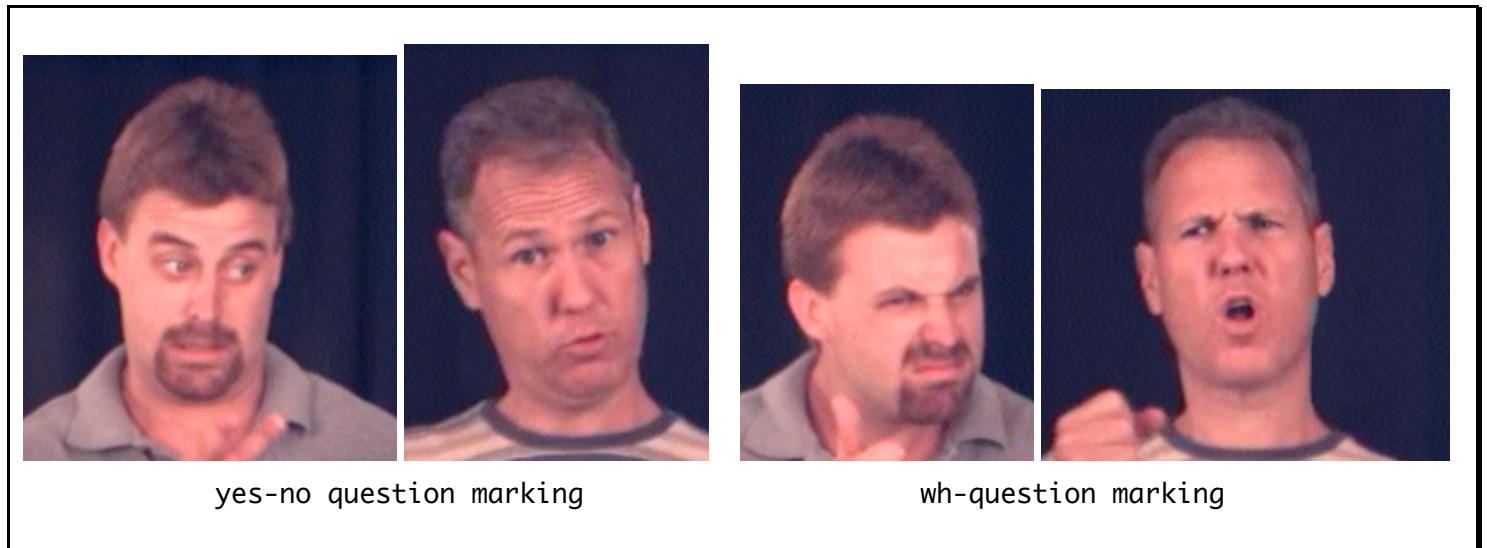
Figure 24. Direct questions

rhetorical yes-no question marking   rhetorical wh-question marking

Figure 25.   Rhetorical questions

♦ Negation

The non-manual marking for negation generally consists of a side-to-side headshake, plus the facial expression shown in Figure 26.

negative headshake
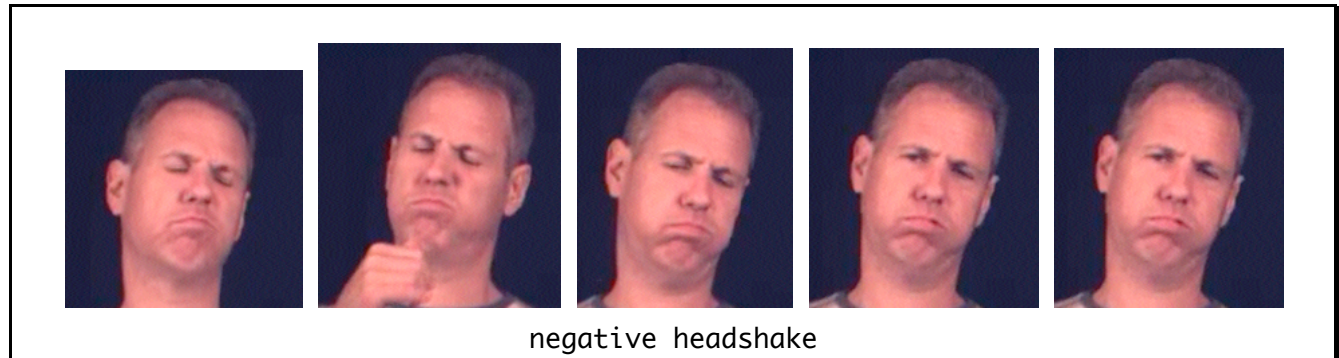
Figure 26.   Facial expression and repeated headshake associated with negation

♦ Role Shift

This field is used to annotate what has been referred to as 'role shift' or 'referential shift', wherein the signer assumes the perspective of someone else, such as John (e.g.). This has been annotated as: 'rs:John'

♦ But wait, there's more

Just as we have not attempted an exhaustive transcription of absolutely everything that is happening anatomically, we have likewise not labeled everything that is of grammatical interest or significance. In some cases, we made conscious choices not to include certain information. That is the case with non-manual correlates of agreement or adverbials, for example. (The relevant behaviors are nonetheless annotated in the anatomical fields.) In other cases, further research is required to analyze the significance and characteristics of the markings.

Fields for parts of speech

There are two fields for coding part of speech information. The first field (POS) includes part of speech "tags" that should be familiar to linguists, while the second includes tags from the set established by the Linguistic Data Consortium (http://www.ldc.upenn.edu/). The American Sign Language Linguistic Research Project has used the first set of tags, as listed below.

POS

Noun (N)
Proper Noun (PN)
Pronoun (Pro)
Determiner (Det)
Quantifier (Quant)
Wh-word (Wh)
Number (Num)
Negation (Neg)
Verb (V)
Adjective (Adj)
Adverb (Adv)
Preposition (Prep)
Possessive (Poss)
Modal (Modal)
Tense (Tns)

Classifier (CL)
Conjunction (Conj)
Particle (Prt)
Reflexive (Refl)
Demonstrative (Dem)
Discourse Marker (DM)
Aspect (Asp)
Modal + Negation (Modal+Neg)
Negation + Verb (Neg+V)
Quantifier + Wh-word (Quant+Wh)
Tense + Negation (Tns+Neg)
Verb + Aspect (V+Asp)
Wh + Particle (Wh+Prt)
Tense + Aspect (Tns+Asp)

In general, we have encoded part of speech information in the main part of speech track. We have used the non-dominant POS track only when the part of speech of what is being signed on the non-dominant hand is different from what is being produced by the dominant hand

Appendix A: Field and value names and labels

Overall list of field names and labels

	Field Names	Field Labels
Head position	head pos: tilt fr/bk	hp: tilt fr/bk s
	head pos: turn	hp: turn
	head pos: tilt side	hp: tilt side
	head pos: jut	hp: jut
Head movement	head mvmt: nod	hm: nod
	head mvmt: shake	hm: shake
	head mvmt: side to side	hm: side<–>side
	head mvmt: jut	hm: jut
Body	body lean	body lean
	body mvmt	body mvmt
	shoulders	shoulders
Eyes, Nose, and Mouth	eye brows	eye brows
	eye gaze	eye gaze
	eye aperture	eye apert
	nose	nose
	mouth	mouth
	English mouthing	English mouthing
	cheeks	cheeks
Neck	neck	neck
Grammatical information	negative	negative
	wh question	wh question
	yes-no question	yes-no question
	rhetorical question	rhq
	topic/focus	topic/focus
	conditional/when	cond/when
	relative clause	rel. clause
	role shift	role shift
	subject agreement	subj agr
	object agreement	obj agr
	adverbial	adv
Part of Speech	POS	POS
	Non-dominant POS	POS2
Gloss Fields	main gloss	main gloss
	non-dominant hand gloss	nd hand gloss
Text Fields	English translation	english

Head position fields

head pos: tilt fr/bk	
hp: tilt fr/bk	
start	s
end	e
front	front
slightly front	-front
further front	+front
back	back
slightly back	-back
further back	+back

head pos: tilt side	
hp: tilt side	
start	s
end	e
left	left
slightly left	-left
further left	+left
right	right
slightly right	-right
further right	+right

head pos: turn	
hp: turn	
start	s
end	e
left	left
slightly left	-left
further left	+left
right	right
slightly right	-right
further right	+right

head pos: jut	
hp: jut	
start	s
end	e
forward	for
slightly forward	-for
further forward	+for
back	back
slightly back	-back
further back	+back

Head movement fields

head mvmt: nod	
hm: nod	
start	s
end	e
rapid	rapid
slight rapid head nod	-rapid
slow	slow
slight slow head nod	-slow
single	single
slight single head nod	-single

head mvmt: side to side	
hm: side<->side	
start	s
end	e
rapid	rapid
slow	slow
single	single

head mvmt: shake	
hm: shake	
start	s
end	e
rapid	rapid
slight rapid head shake	-rapid
slow	slow
slight slow head shake	-slow
single	single
slight single head shake	-single

head mvmt: jut	
hm: jut	
start	s
end	e
slow	slow
forward	for
back	back

Body movement fields

body lean	
body lean	
start	s
end	e
left	left
right	right
forward	for
slightly forward	-for
forward/left	for/lf
forward/right	for/rt
back	back
slightly back	-back
back/left	bk/lf
back/right	bk/rt

body mvmt	
body mvmt	
down	down

neck	
neck	
start	s
end	e
tensed	tns
tensed/left	tns/lf
tensed/right	tns/rt

shoulders	
shoulders	
start	s
end	e
left	left
slightly left	-left
left/down	lf/dn
left/raised	lf/raised
right	right
slightly right	-right
right/down	rt/dn
right/raised	rt/raised
down	down
raised	raised
further raised	+raised
forward	for
forward/left	for/lf
forward/right	for/rt
back	back
back/left	bk/lf
back/right	bk/rt

*Fields related to the eye and nose
region*

eye brows	
eye brows	
start	s
end	e
raised	raised
slightly raised	-raised
further raised	+raised
lowered	lwrd
slightly lowered	-lwrd
further lowered	+lwrd

eye aperture	
eye apert	
start	s
end	e
blink	bl
squint	sq
slightly squinted	-sq
further squinted	+sq
lowered lid	low
slightly lowered	-low
further lowered	+low
wide	wide
wider	+wide
closed	cl

eye gaze	
eye gaze	
eg	
left	left
right	right
up	up
up/left	up/lf
up/right	up/rt
down	down
down/left	dn/lf
down/right	dn/rt
watch hands	track-hd
to addressee	adresee

nose	
nose	
start	s
end	e
wrinkle	wr
tensed	tns
slightly tensed	-tns

Other face and mouth fields

mouth	
mouth	
start	s
end	e
lips pursed:oo	oo
lips pursed:oo-tight	oo-tight
lips pursed:mm	mm
tongue out	th
tongue sucked in quickly	thp
tongue mvmt lateral	tml
cha	cha
sta	sta
puh	puh
pow	pow
sh	sh
cs	cs
intense	int
open	open
open & round	open/rd
open & tense	open/tns
open & corners down	open/cd
raised upper lip	rul
lips spread	ls
lips spread & crnrs up	ls/cu
lips spread & crnrs down	ls/cd
blow	bl
bite lower lip	bll
tongue on lwr lip	toll
open & tongue visible	otv
brr	brr
smile mouth open	open-smile

cheeks	
cheeks	
start	s
end	e
puffed	puf
puff left	puf/lf
puff right	puf/rt
tensed	tns
less tensed	-tns
tensed left	tns/lf
tensed right	tns/rt

Grammatical interpretive fields

negative	
negative	
start	s
end	e
negation	neg

topic/focus	
topic/focus	
start	s
end	e
focus/top1	foc/top1
top2	top2
top3	top3
foc/prop-with-ref-to	foc/ref
sentence-initial adverb	foc/adv
focus	focus

wh question	
wh question	
start	s
end	e
whq	q/wh

yes-no question	
yes-no question	
start	s
end	e
yes-no question	q/y-n

conditional/when	
cond/when	
start	s
end	e
conditional	cond
when	when

rhetorical question	
rhq	
start	s
end	e
rhq	rhq
wh rhq	rhq/wh
yes-no rhq	rhq/y-n

relative clause	
rel. clause	
rel-cl	rel-cl

role shift	
role shift	
rs: name	
John	John

subject agreement	
subj agr	
start	s
end	e
agr-S	agr-S
agr-dS	agr-dS

object agreement	
obj agr	
start	s
end	e
agr-O	agr-O

adverbial	
adv	
start	s
end	e
far	far
cs	cs
stress	stress
mm	mm
oo	oo
cha	cha

(same tags used for both hands)

POS	
POS	
Noun	N
Proper Noun	PN
Pronoun	Pro
Determiner	Det
Quantifier	Quant
Wh-word	Wh
Number	Num
Negation	Neg
Verb	V
Adjective	Adj
Adverb	Adv
Preposition	Prep
Possessive	Poss
Modal	Modal
Tense	Tns
Classifier	CL
Conjunction	Conj
Particle	Prt
Reflexive	Refl
Demonstrative	Dem
Discourse Marker	DM
Aspect	Asp
Modal + Negation	Modal+Neg
Negation + Verb	Neg+V
Quantifier + Wh-word	Quant+Wh
Tense + Negation	Tns+Neg
Verb + Aspect	V+Asp
Wh + Particle	Wh+Prt
Tense + Aspect	Tns+Asp

Appendix B: Reserved words and characters

Several words and characters are reserved for use in search queries. The list of reserved words and characters can be viewed from within the program by selecting SignStream Help from the Apple menu.

Reserved words cannot be used as the name or label (short name) of a participant or field. Reserved characters cannot appear within any name or label of a participant, field, or field value.

Reserved words:

and
or
with
not
before
after
startframe
endframe
framed
unframed
participant
gloss-field
non-manual-field
Notes
-wholeword
-matchcase

Reserved characters:

[
]
*

Appendix C: Some hard choices we have made

♦ How much to code?

At every level, decisions have been made about what level of detail to include in the transcriptions. When particular body or head movements are an integral part of the articulation of the sign (such as the slight movement forward of the head as the chin meets the hand for the contact produced in a sign like **MOTHER**), we have tended not to transcribe such head movements. Here, there is an obvious trade-off. In strictly objective terms, there is movement of the head. However, this movement is attributable to the phonetics of the lexical item and has no larger linguistic significance. We have generally chosen not to transcribe such non-manual movements.

Another difficulty arises with the coding of head position. There is a slight natural tilt that is part of a signer's 'neutral' head position. In general, we have not coded this position as involving a tilt.

♦ Things that happen at the edges of utterances

Sometimes the transition for a non-manual marking is already well underway at the initial frame of an utterance. For example, the eyebrows may already be significantly raised, but still moving toward their maximum height. We have coded such occurrences as 's' even when only part of the anticipatory movement is contained within the given utterance.

Likewise, there are sometimes movements at the end of a given utterance that are in fact anticipatory of something else not contained in the utterance. We may not have been completely consistent about the extent to which these extraneous movements have been coded. Sometimes, in fact, these movements are not linguistic in nature, as will be discussed next.

♦ Behaviors attributable to elicitation situation

Head down

In some utterances where the signer had written notes, looking down at the end of the sentence occurs, and it is of no linguistic significance. There may be inconsistency in the extent to which this motion has been transcribed. It is, in any case, an artifact of the data collection situation and should not be construed as a behavior that typically occurs at sentence boundaries.

Direction of eye gaze

In some cases, eye gaze of the signer may be directed at the elicitor, and the position of the elicitor relative to the signer has varied. So, there may be some occurrences of eye gaze that have no other explanation. This could confound analysis of eye gaze behaviors.

♦ Glossing issues

Related lexical forms

In some cases, manual signs are distinguished by mouthing (sometimes English-based). This happens occasionally with present and past tense of verbs, such as **SEE** vs. **SAW**. For consistency, we have glossed all verb forms using a single gloss (e.g., **SEE**). The manual signs do not differ for present and past. Once we have the ability to use symbols to code mouthing, that will be the place to indicate the relevant differentiation. (Given that we are not yet transcribing this information, our transcriptions do not yet reflect this difference.)

Consistency

Other cases where it would be desirable to use the same gloss for signs that have the same essential manual articulation include the following signs:

SHOULD, MUST, HAVE-TO

However, here, to keep with other glossing traditions, we have glossed these signs differently. **SHOULD** is normally articulated with (at least) two distinct downward movements, whereas **MUST** involves a single downward movement. **HAVE-TO** is normally used in negative environments (e.g., **NOT HAVE-TO**), although for some signers (**NOT MUST**) is also possible. Mouthing is used as the distinguishing identifier for **HAVE-TO**. We note our own inconsistency, but so be it.

♦ Part of speech

Wherever possible, we have tried to use the same gloss for signs that have the same manual articulation. In some cases, a single sign can be used alternatively as more than one part of speech, e.g., an adjective or an adverb. In such cases, we have tried to use the same English gloss throughout, choosing the part of speech that seems to occur most frequently for the gloss. The tradeoff is that the gloss is sometimes misleading; however, parts of speech are annotated.

This is particularly problematic when the two words would have very different translations in English depending on the part of speech. Such is the case for the sign we

gloss as **VOMIT**, which, in ASL, can be used as a verb or an adjective (meaning 'disgusting'). (This is similar to the French adjective *déguelasse* meaning 'disgusting' derived from a verb meaning 'vomit'.)

Likewise, we have used a single form to gloss the basic verb and its use as a past participle, e.g. **STEAL** to represent the verb when used actively or as a past particle ('stolen'). We do not wish to enter into the controversy about the existence of passives in ASL, and our use of a single gloss is not intended as representing a position taken on that issue. We are sticking with our (attempt at a) convention of using the same gloss for the same manual sign.

However, inevitably, assignment of a part of speech must be based on a syntactic analysis. In some cases, there is ambiguity in the sentence as signed (in which case we have annotated the POS for only one possible reading). In other cases, the lexical items involved have not yet been fully analyzed. For example, with respect to tense and aspect marking, our work in progress suggests that signs like NOW and BEFORE (in certain contexts) convey information about both tense and aspect. For this reason, we have annotated such signs as Tns+Asp. However, this is pending completion of our investigation of tense and aspect. This particular annotation, 'Tns+Asp,' might better be interpreted, for the time being at least, as 'tense and/or aspect'. Our conventions will inevitably evolve as our ongoing syntactic examination of ASL proceeds.

One oddity that has arisen in the glossing that involves differentiation between nearly synonymous signs in ASL. There are two verbs used with the general meaning of 'give', which we have glossed as **GIVE** and **GIFT**, although both are verbs in ASL. **GIFT** is articulated with the X handshape. Again, we have followed prior glossing systems in making this distinction.

♦ Translations

We have not attempted to include nuances of meaning in the English translations. Many of the distinctions that are found in ASL sentences do not occur naturally in the corresponding English sentences. One example of this involves the translation of various signs produced with pointing of the index finger, which may include adverbials and right dislocated pronominals that would not normally have a direct translation in English. We caution consumers of our annotated data that our English translations are only approximate, at best.

Appendix D: Database export file format

This appendix documents (version 5 of) the format of the text file that is produced when you choose Export Database As Text from the File menu.

All data in SignStream export files are delineated by tabs and carriage returns. The carriage returns indicate where a unified group of data begins and ends and the tabs indicate where each individual datum begins and ends. Thus, export files can be readily viewed in spreadsheet programs (or text editors used by programmers for writing source code).

The appendix first provides a schematic description of the export file format. Next follows a sample exported file based on the sample database, although only the data for the first two utterances are included.

Schematic description of export file format

The following conventions are used in the description below:
    Double quotes surround specific constant labels.
    Angle brackets surround tabs and returns.
    Square brackets surround variable data descriptions.
    Parentheses surround explanations of variable data descriptions.
    All number data are saved as ASCII numeric characters, not as binary codes.


```
Export format version 5

"SIGNSTREAM EXPORT DATA FILE" <return>
"Export data format version:" <tab> [the version number] <return>
"Database:" <tab> [the database file name] <tab> [the database file path name] <return>
"Number of utterances:" <tab> [number of utterances] <return>
<return>
<return>
"Utterance ID:" <tab> [1st utterance's ID] <return>
"Media:" <return>
"Number of video file slots:" <tab> [number of movie file references (unselected references
are blank)] <return>
"Number of audio file slots:" <tab> [number of audio file references (unselected references
are blank)] <return>
"Video" <tab> [1st video slot's file path name (blank if unselected)] <return>
"Video" <tab> [nth video slot's file path name (blank if unselected)] <return>
"Audio" <tab> [1st audio slot's file path name (blank if unselected)] <return>
"Audio" <tab> [nth audio slot's file path name (blank if unselected)] <return>
"Start frame:" <tab> [utterance start frame] <return>
"End frame:" <tab> [utterance end frame] <return>
"Number of participant panes:" <tab> [number of panes] <return>
"Participant:" <tab> [1st participant's full name] <return>
"Number of fields:" <tab> [number of fields in pane] <return>
[1st field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
[nth field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
"Participant:" <tab> [nth participant's full name] <return>
"Number of fields:" <tab> [number of fields in pane] <return>
```

```
[1st field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
[nth field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
"Notes - number of character bytes:" <tab> [number of character bytes] <return>
[text of notes (if there is no notes text then there are three returns between the number of
character bytes indicator and the next utterance)] <return>
<return>
<return>
"Utterance ID:" <tab> [nth utterance's ID] <return>
"Media:" <return>
"Number of video file slots:" <tab> [number of movie file references (unselected references
are blank)] <return>
"Number of audio file slots:" <tab> [number of audio file references (unselected references
are blank)] <return>
"Video" <tab> [1st video slot's file path name (blank if unselected)] <return>
"Video" <tab> [nth video slot's file path name (blank if unselected)] <return>
"Audio" <tab> [1st audio slot's file path name (blank if unselected)] <return>
"Audio" <tab> [nth audio slot's file path name (blank if unselected)] <return>
"Start frame:" <tab> [utterance start frame] <return>
"End frame:" <tab> [utterance end frame] <return>
"Number of participant panes:" <tab> [number of panes] <return>
"Participant:" <tab> [1st participant's full name] <return>
"Number of fields:" <tab> [number of fields in pane] <return>
[1st field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
[nth field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
"Participant:" <tab> [nth participant's full name] <return>
"Number of fields:" <tab> [number of fields in pane] <return>
[1st field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
[nth field name] <tab> [1st value's name] <tab> [start frame] <tab> [end frame] <tab> [nth
value's name] <tab> [start frame] <tab> [end frame] <return>
"Notes - number of character bytes:" <tab> [number of character bytes] <return>
[text of notes (if there is no notes text then there are three returns between the number of
character bytes and the next utterance)] <return>
```

Sample export file   (data for first two utterances shown here)

```
SIGNSTREAM EXPORT DATA FILE
Export data format version:  5
Database:      NCSLGR dataset 1      SignStream 2.0 CD:NCSLGR ƒ:NCSLGR dataset 1
Number of utterances: 32


Utterance ID: 1
Media:
Number of video file slots:  4
Number of audio file slots:  1
Video  SignStream 2.0 CD:NCSLGR ƒ:All the compressed videos:master-compressed:ch4-
397_242_small_0.mov
Video  SignStream 2.0 CD:NCSLGR ƒ:All the compressed videos:slave1-compressed:ch4-
397_242_small_1.mov
```

```
Video   SignStream 2.0 CD:NCSLGR f:All the compressed videos:slave2-compressed:ch4-
397_242_small_2.mov
Video
Audio
Start frame:   0
End frame:     1320
Number of participant panes: 1
Participant:  Norma Bowers Tourangeau
Number of fields:     009
main gloss      IX-1p  140     180     SEE    340     380     fs-JOHN      440     540
        YESTERDAY       660     780     IX-3p:i 940     980
non-dominant hand gloss
head pos: jut start  120     260     back   280     940     end   960     1060
head pos: tilt fr/bk start  680     760     front  780     920     end   940     1100
head pos: tilt side  start  80      300     right  320     940     end   960     1140
nose    start  40      100     wrinkle         120     140     end   160     200
eye aperture    wide    280     380
POS     Pronoun140      180     Verb   340     380     Proper Noun    440     540     Adverb 660
        780     Pronoun         940     980
English translation   I saw John yesterday, him.
Notes - number of character bytes:  44
IX-3p can also be read as IX-loc"over there"


Utterance ID: 2
Media:
Number of video file slots:  4
Number of audio file slots:  1
Video   SignStream 2.0 CD:NCSLGR f:All the compressed videos:master-compressed:ch4-
398_243_small_0.mov
Video   SignStream 2.0 CD:NCSLGR f:All the compressed videos:slave1-compressed:ch4-
398_243_small_1.mov
Video   SignStream 2.0 CD:NCSLGR f:All the compressed videos:slave2-compressed:ch4-
398_243_small_2.mov
Video
Audio
Start frame:   20
End frame:     1320
Number of participant panes: 1
Participant:  Norma Bowers Tourangeau
Number of fields:     010
main gloss      LOVE    340     400     fs-MARY 520     660     |760    fs-JOHN      840
        1000    IX-loc:i        1040    1120
non-dominant hand gloss
topic   top2    200     660
body lean       forward         20      20      end    40      240
head mvmt: nodsingle 200     660     end    680     800
head pos: tilt side  start  160     460     right  480     660     start  680     1000    left
        1020    1140    end    1160    1320
eye brows       raised 20      660     end    680     780
eye aperture    start  20      180     wide   200     660     end    680     700     blink  720
        740
POS     Verb   340     400     Proper Noun    520     760     Proper Noun    840     1000    Adverb
        1040    1120
English translation   As for loving Mary, John (does).
Notes - number of character bytes:  0
```

Appendix E: Summary of glossing conventions

♦ **General conventions**

Convention	Example	Explanation
capital letters	WORD	English word used to represent an ASL sign.
–	OH-I-SEE THANK-YOU	Used to separate words if the English translation of a single sign requires more than one.
/	BOLD/TOUGH WOW/AWFUL	Used when one sign has two different English equivalents.
fs-	fs-JOHN	Fingerspelled word.
	fs-UN+PREDICTIBLE	Fingerspelled prefix.
#	#CAR #EARLY	Fingerspelled loan sign.
ns-	ns-LINCOLN ns-CAPE-COD	Name sign for 'Lincoln' or 'Cape Cod'.
|-->	fs-JOHN|-->	Hold sign. Used to represent a hand position that is held at the end of a sign. For example, after fingerspelling 'John' the signer may hold the final position (in this case, the N handshape). This same diacritic can be used to indicate perseveration of the non-dominant hand.
GLOSS^GLOSS	WILL^NOT	Contraction.
+	MOTHER+FATHER	Compound.
!!	!MUST!	Indicates stressed articulation, for emphasis.

Convention	Example	Explanation
( )	(nod) (shake head) (draws shape)	Words in ( ) indicate an action or movement made without a sign, sometimes with linguistic meaning.
(2h)GLOSS	(2h)#DO++	Used when a sign that is commonly 1-handed is made with both hands.
(2h)alt.GLOSS	(2h)alt.GUESS	The notation 'alt.' indicates that both hands move in an alternating manner.
(1h)GLOSS	(1h)LOVE	Used when a sign that is commonly 2-handed is made with one hand.
i:GLOSS:j	i:GIVE:j 1p:GIVE:2p	'i' and 'j' designate unique spatial locations associated with the subject and object referents. '(I) give (you)… '
Noun	fs-JOHN i:GIVE:j	John is signed in a neutral location.
Noun:i	fs-JOHN:i i:GIVE:j	John is signed in the location associated with the referent (the same location with which the verb displays manual subject-verb agreement).

Convention	Example	Explanation
+	DIFFERENT++ GO+	Indicates repetition (reduplication) of a sign. The number of + signs indicates the number of repetitions.
Pronoun IX-[person]:i Determiner IX-3p:i Possessive POSS-[person]:i Emphatic reflexive SELF-[person]:i	IX-1p POSS-1p SELF-1p	1st person pronoun 1st person possessive marker 1st person emphatic reflexive marker (as in 'I did it *myself.*').
	IX-2p POSS-2p SELF-2p	Pronoun referring to addressee. Possessive marker referring to addressee. Emphatic reflexive marker referring to addressee.
	IX-3p:i POSS-3p:i SELF-3p:i	Pronoun or determiner referring to singular third person referent associated with location 'i'. Possessive marker referring to singular third person referent associated with location 'i'. Emphatic reflexive marker referring to a singular third person referent associated with location 'i'.
	THUMB-IX-3p:i	Pronoun referring to singular third person referent associated with location 'i' articulated with the thumb.
Adverbial IX-loc:[location] IX-dir:[direction]	IX-loc:j	Adverbial produced with index finger pointing to location 'j'.
	IX-loc"under table" IX-dir"around the corner to the right" IX-loc"far" THUMB-IX-loc"behind"	Adverbial with location described.

Convention	Example	Explanation
IX-[person]-[numeral]:i/j/k POSS-[person]-[numeral]:i/j/k	IX-3p-pl-2:x/y IX-3p-pl-3:x/y/z	Third person pronoun referring to the 2 (or 3) referents: x, y (and z).
	IX-1p-pl-2:x	First person pronoun referring to signer plus the referent associated with the location 'x'.
	IX-2p-pl-3:x,y	Second person pronoun referring to addressee plus the two referents associated with locations 'x' and 'y'.
-3p-pl-arc	IX-3p-pl-arc POSS-3p-pl-arc SELF-3p-pl-arc 1p:GIVE-3p-pl-arc	Pronoun (or possessive or emphatic reflexive) referring to singular third person referent associated with location 'i' articulated with the thumb. 'I give (it) to them.' Subject agreement is 1st person. Object agreement (the end point of the sign) is plural (an arc).
-loc-arc	IX-loc-arc	Adverbial ('there') using an arc to designate locations.
neu:GLOSS	JOHN neu:GIVE:j MARY	'John gave (it) to Mary' without overt spatial subject agreement on GIVE.
	JOHN i:GIVE:j MARY	The same sentence as above, *with* overt spatial subject agreement on GIVE.

Convention	Example	Explanation
GLOSS-indef	JOHN i:GIVE-indef SOMETHING/ONE	'John gave (it) to someone.'
	JOHN i:GIVE:j MARY	'John gave (it) to Mary.'
Non-manual:i	eg:i eg: "under table"	Eye gaze (or any other non-manual behavior) pointing to the location, indicated by the index 'i' or other description.
	eg:indef	Eye gaze showing agreement with an indefinite NP, as described above.
GLOSS-aspect	STUDY-continuative	Aspectual inflections are indicated following the gloss.
GLOSS++	READ+++	This reflects the reduplication.
GLOSS-aspect(:i)	1p:GIVE-distributive-3p-pl-arc GIFT-distributive:i	'(I) gave each (of them)… ' '(they) each gave (one person)… '
GLOSS-recip	LOOK-AT-recip:i,j	'The referents associated with locations 'i' and 'j' look at each other.'
GLOSS-recip++	(2h)alt.GIVE-recip+++:i,j	'The referents associated with locations 'i' and 'j' are involved in multiple acts of giving to each other.' The two hands move repeatedly in an elliptical path, starting at locations 'i' and 'j'.

Convention	Example	Explanation
[classifier type]: (handshape)"___"	DCL"curly hair" ICL"turn crank" LCL:B"leaf drifting to the ground" (2h)BPCL:1"crossing legs" SCL:1"person walking stiffly and hurriedly" PCL:3"people walking"	Classifiers
(i:)[classifier type]: (handshape)"___"(:j)	j:PCL:1"person approaching":k	Classifiers
(handshape)"___"	"wave no" "wave left" (2h)5wg"after a while"	Gesture-like sign.
	(H)"focus"	Use of one hand (H handshape) to draw attention to fingerspelling by the other hand.
	"um"	A sign/gestures, involving wiggling of the fingers, used as a discourse marker to retain the attention of the addressee.

♦ **Specific gloss items**

Discussed already

BREAK-DOWN vs. **ENGINE-FALL-OUT**

The sign BREAK-DOWN is a symmetrical two-handed sign. ENGINE-FALL-OUT is the gloss used for a sign that involves the non-dominant hand facing palm downward; the dominant hand in an S handshape (representing the engine) starts out under the non-dominant hand , against the palm, and then drops.

#**EX**

Marker of tense and aspect used by some ASL signers, expressing habitual past; similar to English 'used to'.

FIND/FIND-OUT vs. **FIND^#OUT**

Since in some contexts this sign is best translated as 'find' and in others as 'find out', we have glossed all occurrences of the sign in this way. (Note that we use a different gloss for the sign FIND^#OUT, which is sometimes synonymous with FIND/FIND-OUT).

FUTURE vs. **(L)FUTURE**

Future tense markers differing in handshape used: B handshape (with fingers together or spread) for FUTURE as opposed to L handshape for (L)FUTURE).

GIVE vs. **GIFT**

We use GIVE to represent the verb made with the 5 fingers coming together. GIFT uses the X handshape (but is also a verb).

MOTHER

The open 5-handshape is used. The thumb touches the chin.

MOTHER+

Same as above, but the thumb touches the chin twice.

MOTHERwg

The same handshape is used, and the same point of contact with the chin. However the thumb remains in contact with the chin and the other 4 fingers wiggle.

NOT-LIKE vs. **(Y)NOT-LIKE**

The latter sign is used colloquially by some signers to indicate that they don't care for something. Articulated with the Y handshape. The movement begins with the thumb at the nose, palm facing basically downward. The wrist then twists outward (lowering the thumb) as the hand moves down and away from the body. Distinguished from the sign conventionally glossed as NOT-LIKE and that glossed as NOT-CARE.

part:indef

An indefinite focus particle articulated with a single outward movement of one or both palms (facing upward), as shown in Figure 1. See Conlin et al. (in press).

QMwg

Question marking sign (with wiggling, as shown in Figure 2).

REALLY

We have used this gloss not only for the noun and adjective signs made with the index finger starting at the mouth and moving downwards (meaning 'real, 'really,' 'true,' or 'truly'), but also for a discourse marker used by some signers.

REFUSE

This is how we have chosen to gloss the sign sometimes glossed as WON'T.

SEE vs. **SEE-SEE**

Both signs use the V handshape and the middle finger touching the cheek just below the eye. **SEE** is the transitive verb describing visual perception; the hand extends in an outward movement from the eye. **SEE-SEE** involves short pathlength and two brief contacts made by the middle finger under the eye. The meaning is more figurative, as in 'we'll *see* what will happen'.

SINK vs. **SCL:3"vehicle sink"** vs. **SCL:B"boat sink"**

We have distinguished signs translated as 'sink' in English in this way, based on whether a classifier is involved (and if so, which one).

SOMETHING/ONE

A sign in ASL that may be translated as either 'something' or 'someone'. It is also used as an indefinite determiner. This is a shorthand way of representing SOMETHING/SOMEONE.

SWITCH

This is the sign made with the L handshape that is used to indicate a switch to another person's turn or, more generally, to something different.

VOMIT

This gloss is used both for the verb and the adjective meaning 'disgusting.' Since the manual forms are the same, the same gloss was used, for consistency.

"WHAT"

A wh-sign produced with both hands extended, palms facing up, moving slightly from side to side. Distinguished from #WHAT and 'WHAT' (articulated with the index finger brushing against the open palm of the non-dominant hand).

(Y)WHY vs. (25)WHY vs. (25>Y)WHY

Since the sign meaning 'why' can involve a Y handshape, a 25 handshape, or a transition between the two, we have differentiated those signs as indicated.

Additional conventions used for glossing

Here we illustrate some choices made for the glossing of particular signs. These are illustrated because the way in which these signs are glossed may not be obvious.

COUNT-ON-FINGERS

In an enumeration, we gloss each separate item as:

COUNT-ON-FINGERS:1

COUNT-ON-FINGERS:2

and so on.

BLANK

ALL-GONE
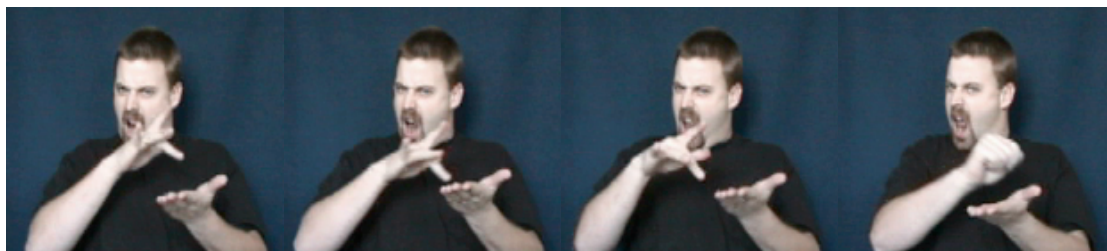
RUN-OUT
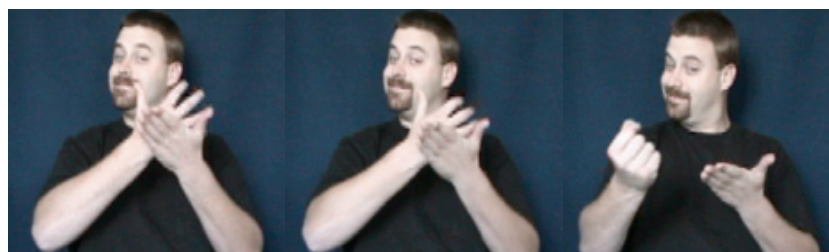
GONE
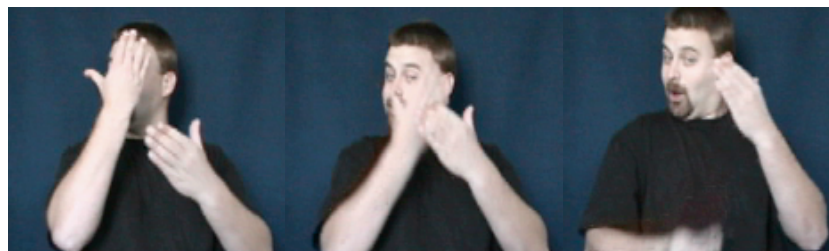
EMPTY
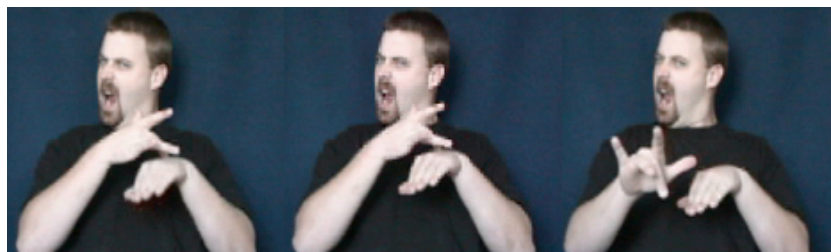
THAT'S-ALL
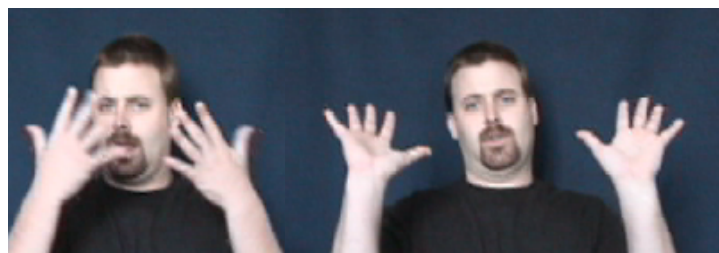
DEFLATE
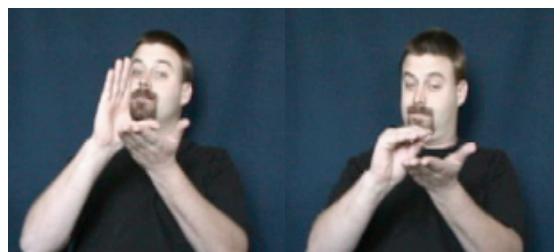
DECREASE
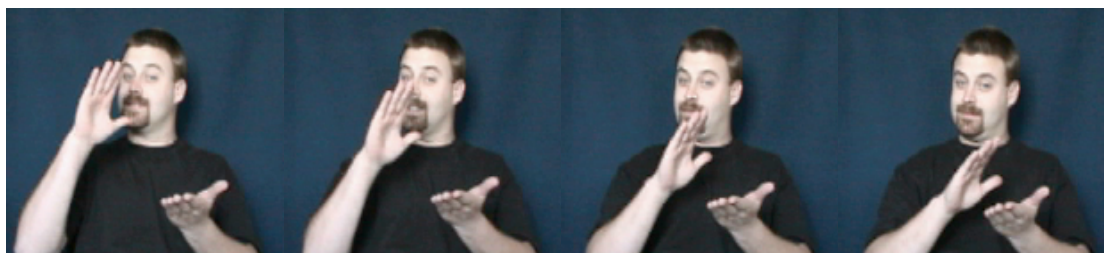
LOW/LOWER
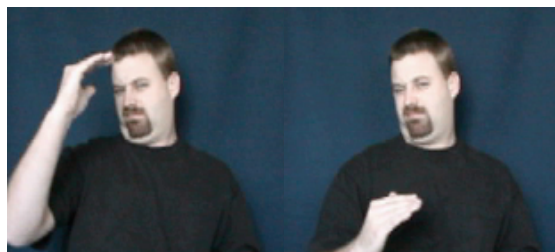
(2h)LOW/LOWER
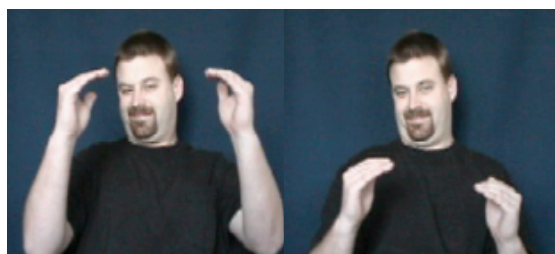
DURING/WHILE
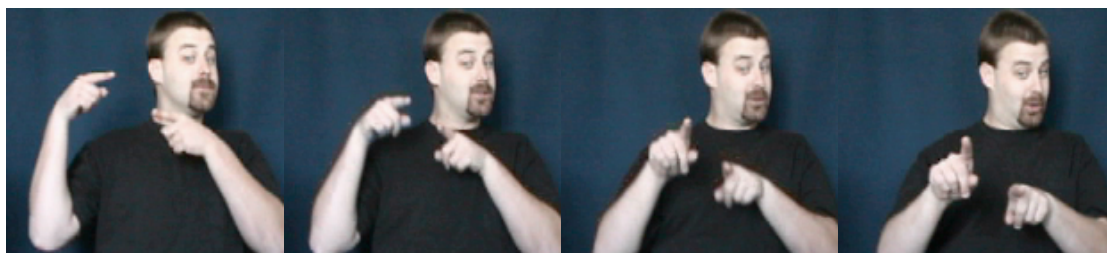
FRUGAL
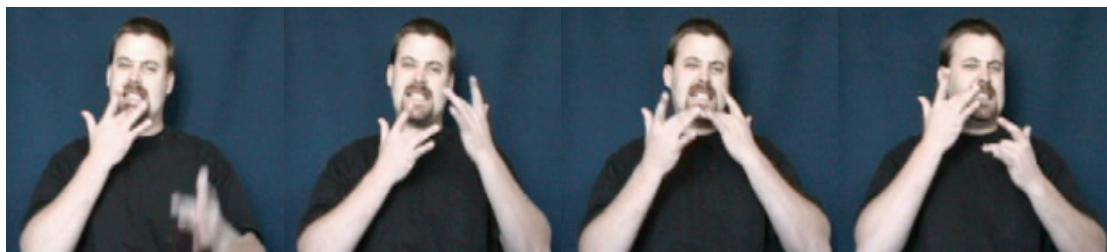
ETC.
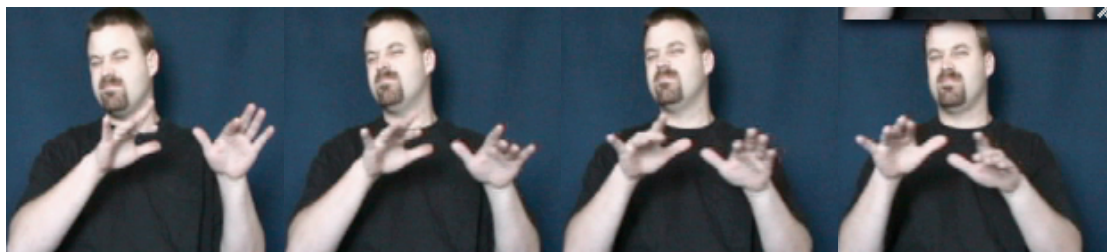
FALL-INTO-PLACE
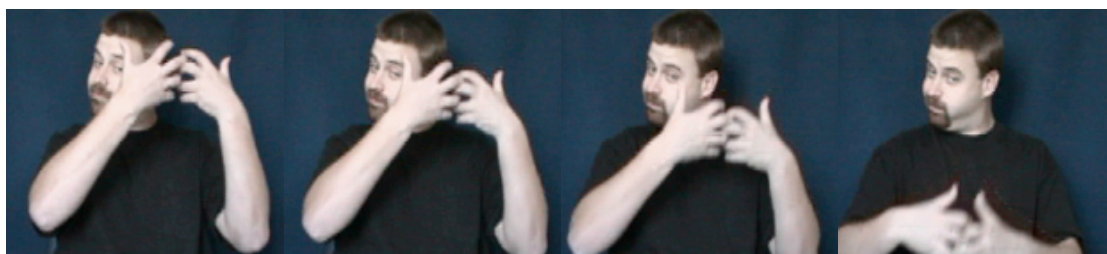
FORGET-IT
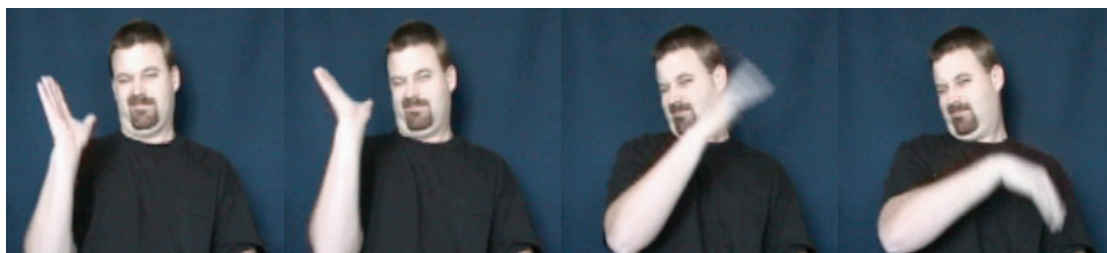
LITTLE-BIT
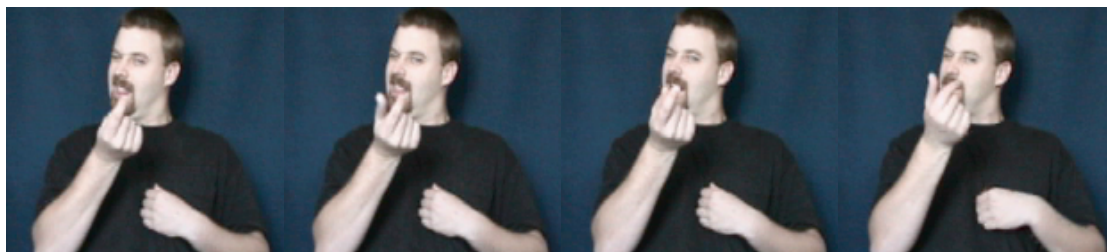
"quote"
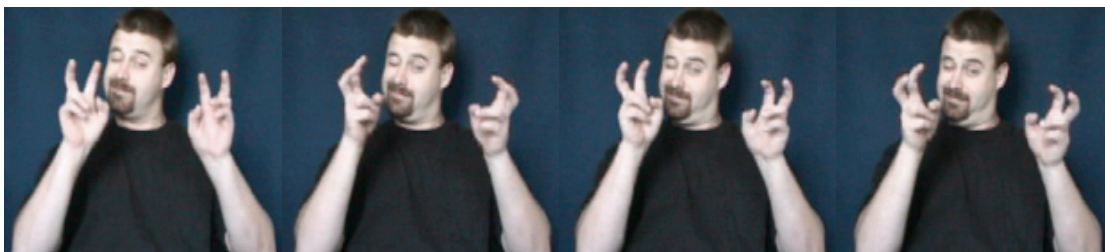
RIGHT-HERE
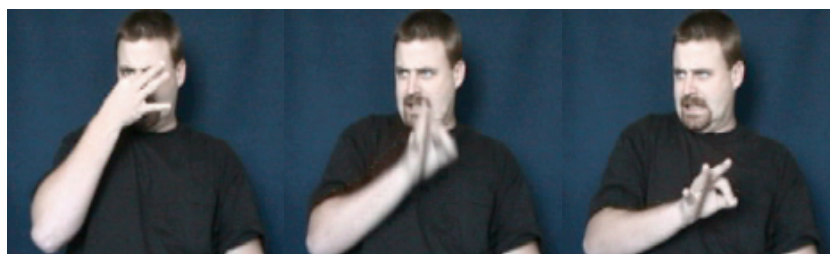
SPECIALIZATION
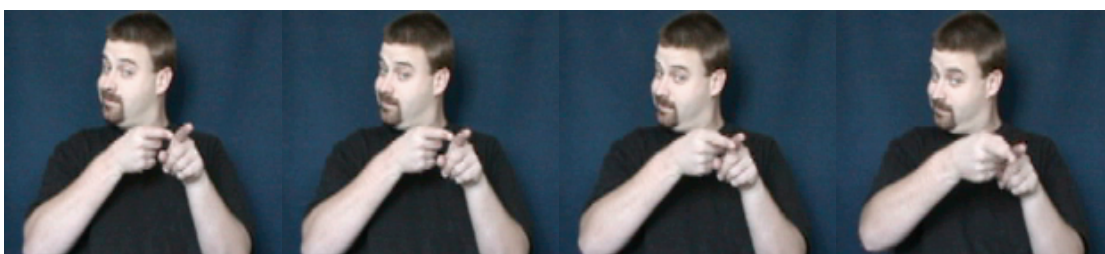
STAY-UP-ALL-NIGHT
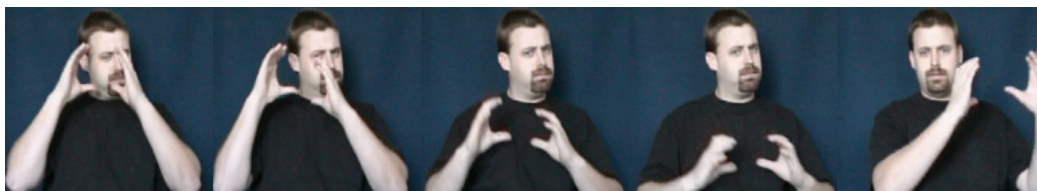
(5)WOW
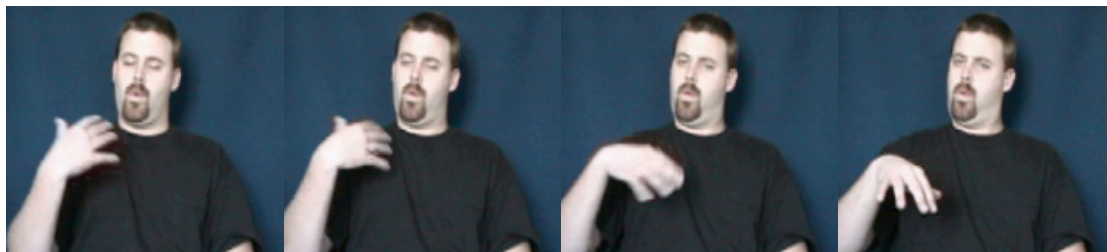
(2h)(5)WOW
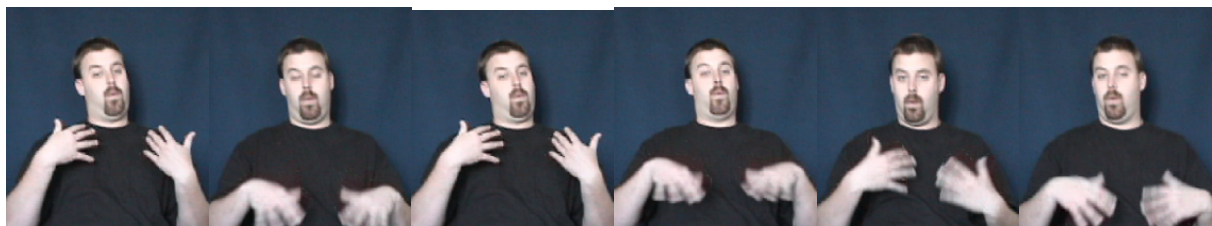
WOW/AWFUL
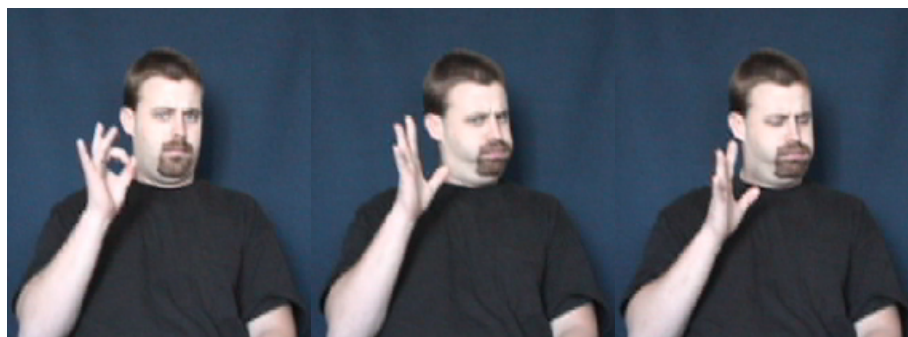
(Y)WOW
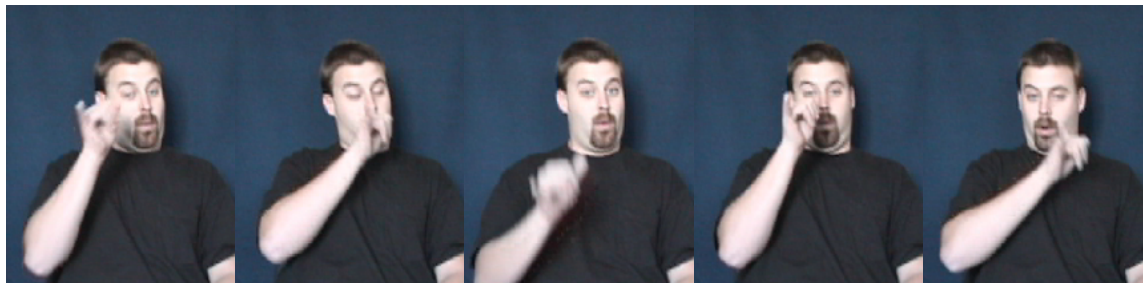
WHEW/RELIEVED

"not give a darn"
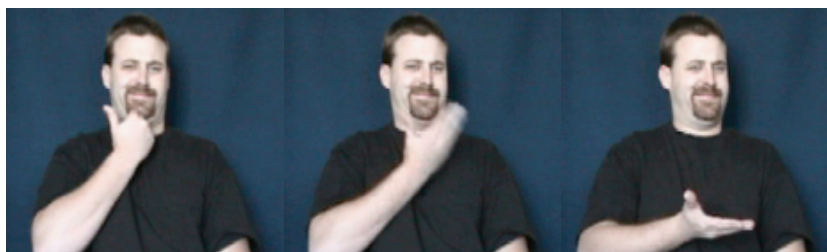
THUMBS-UP/GOOD
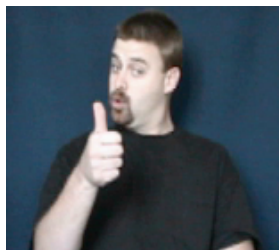
(2h)THUMBS-UP/GOOD
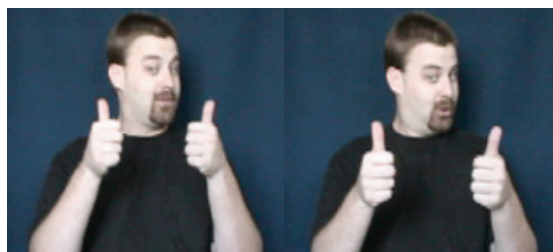
Appendix F: Handshapes
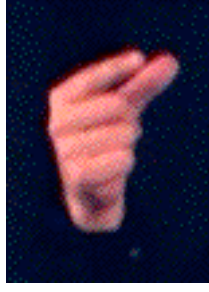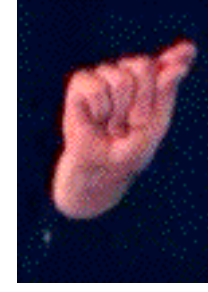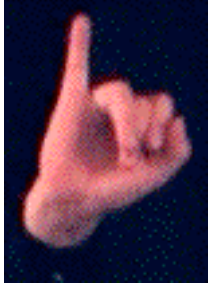
Here the handshape names we use are listed, and the handshapes are illustrated.
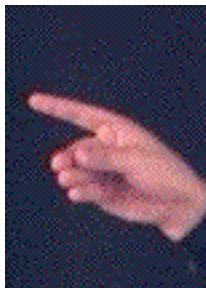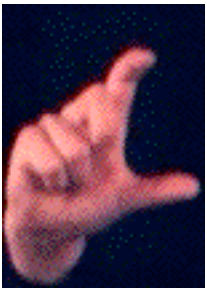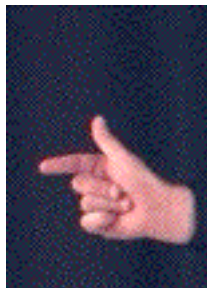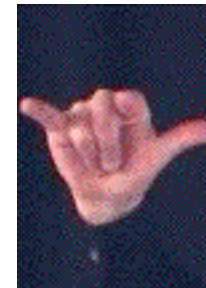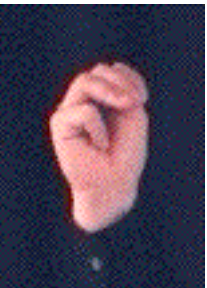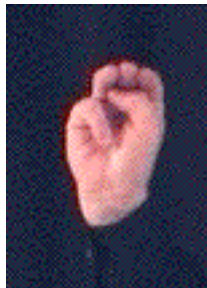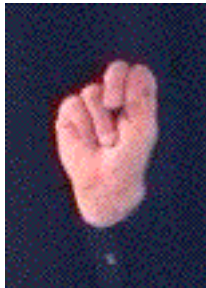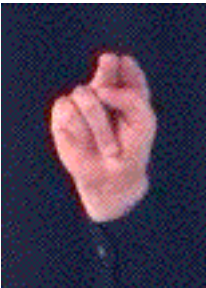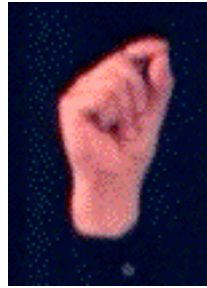
The term 'bent' is used to indicate flexion at the base joint. The term 'curved' is used systematically when there is flexion at non-base joints (following, e.g., Crasborn and van der Kooij, in preparation). Handshapes in which the selected fingers are together are listed above the corresponding handshapes in which the selected fingers are spread.
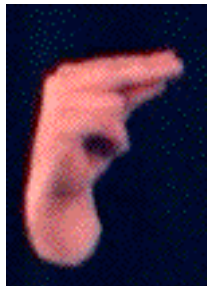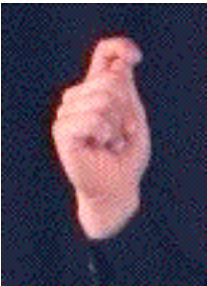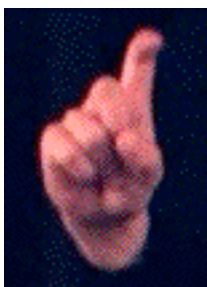
Handshapes named in terms of letters used in fingerspelling are written with capital letters. Hyphens are used with modifiers.

A	**B**	**crvd-B**	**crvd-sprd-B**	**B-xd**
flat-B	**B-L**	**bent-B**	**bent-B-L**	**C**
sml-C/3	**lrg-C/3**	**flat-C**	**tight-C**	**tight-C/2**
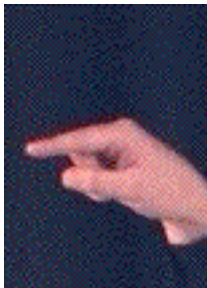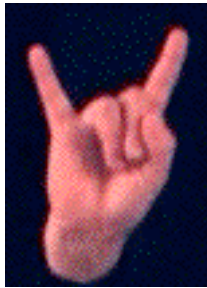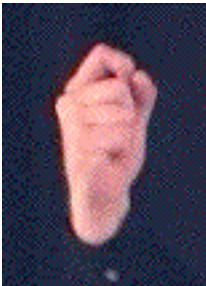
C-L	**crvd-flat-B**	**D**	**E**	**loose-E**
alt-M	**alt-N**	**F**	**cocked-F**	**open-F**
flat-F	**G**	**flat-G**	**alt-G**	**I**

K	**alt-P**	**L**	**crvd-L**	**bent-L**
L-X	**I-L-Y**	**bent-I-L-Y**	**M**	**bent-M**
full-M	**N**	**bent-N**	**O**	**baby-O**

flat-O	flat-O/2	R	S	T

X-over-thumb	U	bent-U	crvd-U	V

crvd-V	W	crvd-W	X	Y

1	**bent-1**	**Horns**	**O/2-Horns**	**bent-Horns**
3	**U-L**	**crvd-3**	**4**	**5**
crvd-5	**5-C**	**5-C-tt**	**5-C-L**	**6**

7	8	cocked-8	open-8	25
9	open-9	10	fanned-flat-O	cocked-S
cocked-U				

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