ASL Theoretical Linguistics:
Some Fun Introductory Problems

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Theoretical linguistics is about formally describing the structure of language – it's grammar. Unlike what we usually call grammar, however, many of the linguistic rules studied in theoretical linguistics are subconscious for native speakers.

Three fields within theoretical linguistics are syntax, morphology, and phonology. Although we tend to talk about them separately, the boundaries blur together a bit in practice.

Syntax Rules regarding sentence structure. (Consider: English sentences like to come in the order Subject-Verb-Object, commonly called SVO order. Classical Arabic sentences are VSO. Japanese sentences are SOV, with added complexity because Japanese has a strong Topic-Comment structure that lets "topics" move to the front of the clause even when they are objects. These are all examples of syntax, or the rules that govern the order of words.)

Morphology Rules regarding word structure. *Morphemes* are the smallest meaningful units. (Consider: English allows "piglet" but not "*doglet", "impossible" but not "*umpossible", and "brotherhood" but not "*friendhood". German uses a different word form for indefinite and definite forms of "boy": "ein Junger" but "der Junge". These are all examples of morphemes, or extra material that can be added to change a word's meaning or to reflect its grammatical role.)

Phonology Rules regarding sound or articulation structure. (Consider: English speakers articulate the "n" in "ten" differently from the "n" in "tenth". Spanish speakers use a trill for "r" in "Israel" and "rey" but a tap in "tres". These are all examples of changes to phonology, or our pronunciation of a word, based on its environment.)

In theoretical linguistics problems, we take observational data and work to identify the principles governing the data. This document provides American Sign Language data and asks you to discover underlying theoretical rules.[1] It aims primarily for morphology but hits other topics too. Unlike most materials on ASL linguistics, it doesn't assume that you're fluent in American Sign Language or in linguistic theory.

By working these three problems, you'll discover some features of ASL that are unique to spatial languages, as well as features that ASL shares with other world languages. The problem sets can be done in any order (they are ordered to facilitate double-sided printing).

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[1]NB: The author is a non-native speaker of American Sign Language. She worked to ensure the data are grammatical, but there may still be errors. Please reach out if you see any.

1   ASL Syntax

In the following dataset, the ASL is given through glosses (word-level translations). ASL consists of both manual signs and nonmanual markers. The nonmanual markers are produced simultaneous to the manual signs. Each manual sign is glossed by an English word. Nonmanual markers are written above the text, glossed with one of the nonmanual's primary visual features.

Given these data, how many of the below questions can you work out an answer to?

	ASL Gloss	English Translation
1	she $\overline{\text{cherish}}^{\text{press lips}}$ homework	She cherishes homework.
2	$\overline{\text{ignore}}^{\text{head tilt}}$ homework	I ignore homework.
3	$\overline{\text{homework}}^{\text{eyebrows up}}$ $\overline{\text{cherish}}^{\text{press lips}}$	As for homework, I cherish it.
4	Jan $\overline{\text{ignore}}^{\text{head tilt}}$ homework	Jan ignores homework.
5	Jan $\overline{\text{ignore}}^{\text{head tilt}}$ homework $\overline{\text{she}}^{\text{nod}}$	Jan ignores homework, she does.
6	$\overline{\text{homework}}^{\text{eyebrows up}}$ Jan $\overline{\text{cherish}}^{\text{press lips}}$	As for homework, Jan cherishes it.
7	$\overline{\text{homework}}^{\text{eyebrows up}}$ Jan like	As for homework, Jan likes it.
8	$\overline{\text{Jan}}^{\text{eyebrows up}}$ $\overline{\text{ignore}}^{\text{head tilt}}$ homework	As for Jan, Jan ignores homework.
9	$\overline{\text{homework}}^{\text{eyebrows up}}$ $\overline{\text{ignore}}^{\text{head tilt}}$ $\overline{\text{I}}^{\text{nod}}$	As for homework, I ignore it, I do.
10	$\overline{\text{cherish}}^{\text{press lips}}$ homework $\overline{\text{I}}^{\text{nod}}$	I cherish homework, I do.

2

ASL Syntax Questions

1. Linguists spent decades debating ASL word order. People trotted out data illustrating just about everything. The debate has only been settled relatively recently, since we've gotten a better handle on nonmanual markers. Given these data, it's pretty easy to see why. Let's start to take it apart.

   (a) Look at the contexts in which each nonmanual marker is used. Either make a separate list of all the ASL and translations and try to find a pattern (a data-driven approach), or make a hypothesis about what is going on and try to disprove it (a hypothesis-driven approach). What effect/meaning does each one seem to have?

      i. $\overline{\text{press lips}}$ =
      ii. $\overline{\text{nod}}$ =
      iii. $\overline{\text{eyebrows up}}$ =
      iv. $\overline{\text{head tilt}}$ =

   (b) In these data, are any words that are part of the translation entirely dropped in the ASL? Are those words always a specific grammatical category (e.g., nouns, pronouns, verbs, adjectives, adverbs)? Do you know any other languages that do something similar?

   (c) Having seen the data, take a wild guess at ASL's underlying word order. All languages have one and only one of the possible orders. (It's okay if your first guess is pretty unsubstantiated. We'll go somewhere more with this in the next question.)

      • SOV (in 45% of languages)
      • SVO (42%)
      • VSO (9%)
      • VOS (3%)
      • OVS (1%)
      • OSV (0%)

   (d) Think about your word order hypothesis. Changes from basic word order tend to be marked grammatically (if they weren't, it would be very hard to make sense of sentences).

      i. Which sentences seem to disprove your hypothesis?
      ii. For each sentence that doesn't fit the hypothesis, how did elements "move" from where your hypothesis would place them to their observed spots?
      iii. Is there a consistent linguistic marker that highlights the unexpected position of the moved word/marks it grammatically? (If not, cross out the hypothesis.)
      iv. Keep trying hypotheses until you find one + some markers that explain the data.

   (e) Overall there are three word-order-related processes at work in the data. Can you describe what each one does? Can you map it to the sentences that illustrate it?

2. Let's write some sentences.

   (a) Using what you've seen in the data, try to write a sentence gloss that doesn't require any nonmanual markers.

   (b) It turns out that sentence you just wrote should probably get some nonmanuals anyway, because totally flat affect (lack of animation) is somewhere between questionable and ungrammatical in ASL. Try expressing the same idea in a different way.

3. Do you think nonmanual markers can be morphemes? Why or why not?

2   ASL Agreement

In the following dataset, the ASL is given through glosses (word-level translations). ASL consists of both manual signs (given in text) and simultaneously produced nonmanual markers (given in supertext). The glosses are not exhaustive. In the data:

- The gloss "CL1" stands for "classifier of the vertical 1 handshape" (a closed fist with a raised index finger pointed up). A classifier is a handshape that represents a certain class of entities; for instance, the 1 handshape represents long skinny things. Given vertical orientation and context, CL1 describes a single upright person.

- The gloss "pt" indicates the signer is pointing at a spot (a closed fist with a raised index finger pointed horizontally).

- The particular points in space where manual signs begin and end are marked with indices preceding and following the word to indicate their positions. Assuming a right-handed signer, index 1 points at the speaker's chest, index 2 points at the viewer, index i is most of an arm's length away on the right side, index j is at medium distance on the right side, index k is close on the right side, and index m is at medium distance on the left side.

- As in Japanese, if a pronoun is inferable from context, it may be dropped.

- Asterisks indicate that the English translation is incorrect.

Given these data, how many of the below questions can you work out an answer to?

	ASL Gloss	English Translation
1	$\overline{\text{man}}^{\text{eyebrows up}}\ _i\text{CL1}_j\ _1\text{ask}_j$	The man came up and I asked him a question.
2	$\overline{\text{man}}^{\text{eyebrows up}}\ _i\text{CL1}_j\ _j\text{ask}_m$	The man came up and asked someone a question.
3	$\overline{\text{man}}^{\text{eyebrows up}}\ _i\text{CL1}_j\ _m\text{give}_j$	The man came up and she gave him something.
4	$\overline{\text{man }_i\text{CL1}_j}^{\text{eyebrows up}}\text{ pt}_1\text{ like pt}_j$	The man who came up, I like him.
5	$\overline{\text{man }_j\text{CL1}_i}^{\text{eyebrows up}}\text{ pt}_i\text{ like pt}_1$	The man who just went away likes me.
6	pt$_2$ see$_k$ pt$_1$	You see me.
7	pt$_1$ see$_j$ finish	I saw her already.
8	pt$_j$ tell$_k$ pt$_1$ and tell$_2$	He told me and he told you.
9	pt$_1$ see$_j$ man $_1$gave$_j$	I saw a man and gave him something.
10	$\overline{\text{man pt}_1\text{ cherish}}^{\text{eyebrows up}}\ _j\text{ask}_2$	The man I cherish asked you a question.
11	pt$_1$ see$_j$ man $_1$ask$_m$	* I saw a man and asked him a question.
12	pt$_j$ see$_2$	* She saw it.

ASL Agreement Questions

1. Let's think about how agreement (a type of morphology) works in ASL.

   (a) Can you group the verbs from this exercise into three different classes based on how they indicate subjects and/or objects? (The verbs are: ask, give, like, see, tell, cherish)

   (b) Consider the asterisked ungrammatical examples. What causes the mismatch between the ASL and the translation?

   (c) The classifier CL1 isn't a verb, but it changes based on its context too. When CL1 moves from one position in space to another, what is it showing? Are the specific positions it moves between meaningful?

   (d) To summarize, how does ASL morphology use space in a rule-driven way?

2. Now let's put what you observed into practice.

   (a) Try to write ASL glosses for the following sentences. Be careful not to simplify too much.

      i. The man is going away.
      ii. You see him.
      iii. I asked you a question.
      iv. She already gave it to you.
      v. The man who just came up sees me.

   (b) If you felt good with part (a), try guessing at ASL glosses for the following sentences:

      i. The man crossed the room.
      ii. The man appeared far away, started coming over, and then walked across my path.
      iii. *(Given that the verb "detest" is grammatically similar to "ask":)* He told me that he detests me.

   (c) What are the correct English translations for the data sentences that were marked with asterisks?

      i. pt_1 see_j man $_1ask_m$ =
      ii. pt_j see_2 =

3. Now let's think about other aspects of ASL morphology.

   (a) Does ASL change the morphology of its verbs for tense (like English) or use context and lexical items like adverbs to establish time (like Chinese)?

   (b) Does ASL change the morphology of its verbs for gender (like Arabic – "he studies" is "yadrus" whereas "she studies" is "tadrus") or not (like French and English, where there is only one singular third person verb form)?

3   Time in ASL

In the following dataset of individual signs, the ASL is shown through drawings.[2] Within the drawings, arrows indicate movement. Doubled arrows indicate repeated movements – look carefully to make sure you're seeing the right sign. Sometimes the initial as well as the final hand position is shown. Nonmanual markers are mostly ignored. (Dictionaries don't generally draw nonmanual markers. Some dictionaries don't even mention they exist. That's a sign of a bad dictionary, of course.)

If you'd like a video, `http://www.youtube.com/watch?v=y31CnAKq1Sw` shows many time-related terms in an easy-to-follow-for-hearing-people format.

Given these data, how many of the below questions can you work out an answer to?

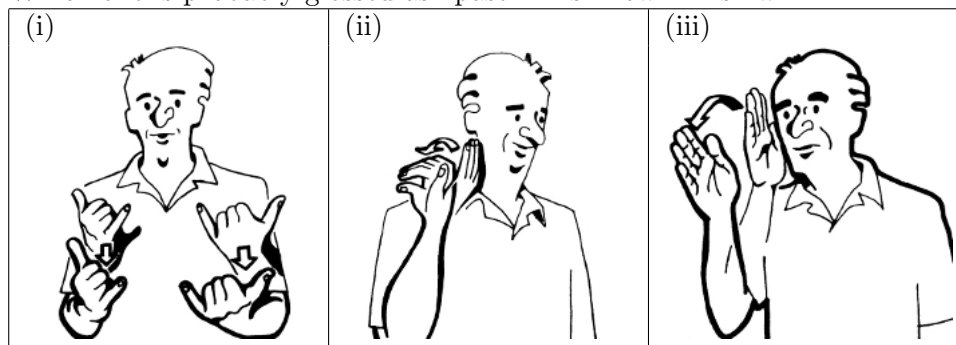| (1) year	(2) two years ago	(3) two years from now
(4) weekly	(5) three weeks	(6) next week
(7) every three months	(8) yesterday	(9) tomorrow

Time in ASL Questions

1. Let's begin by talking grammar. What's going on in these time-related words?

   (a) Start by considering pairs of words with the same root, like the variants of "week" and of "year". Can you get a sense of what the ASL root of each concept is?

   (b) Looking at the data, what similarities do all the future-related words have? The past-related words? The present-related words?

   (c) How is number expressed?

   (d) What is the morpheme that turns a noun into an adverb (e.g., from "week" into "weekly")?

   (e) The smallest piece of a spoken language is a single meaningful sound or *phoneme*, which is produced with a *place of articulation*, a *manner of articulation*, and *+/- voicing*. For instance, 'b' is a voiced bilabial stop (your vocal cords try to vibrate while you stop the flow of air with both lips). The smallest piece of a signed language is also a phoneme. Sign language phonemes have five parameters: (1) *handshape*, (2) *palm orientation*, (3) *movement*, (4) *location*, and (5) *nonmanual markers*.

   In these ASL time-related data, the phonological parameters play an important and obvious morphological role. Which of the five parameters encode(s) the:
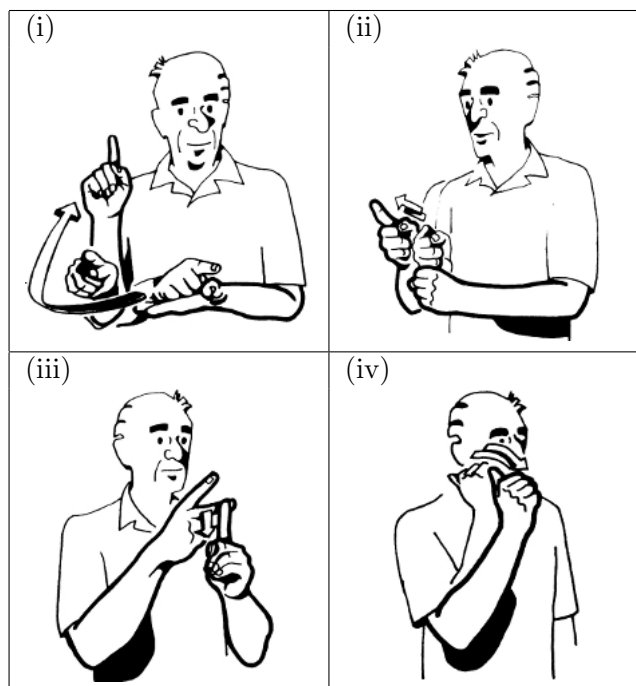   - Number (how many of that unit are being discussed)?
   - Timeline (whether it is in the present/past/future)?
   - Derivation to a form indicating recurrence (turning X into "every X" or "X-ly")?
   - Root/underlying time unit?

2. Now that you've worked through the grammatical rules, let's do some applications.

   (a) All of the signs below are temporal adverbs.
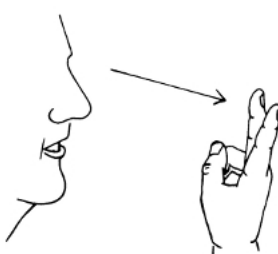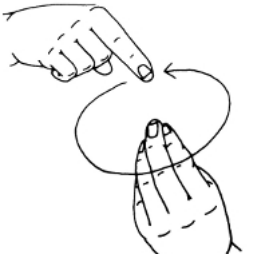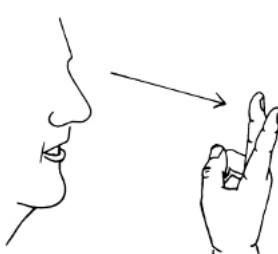   Which one is probably glossed as "past"? As "now"? As "will"?

(b) What might these signs mean?

(c) Try your hand at signing the following words in ASL:

    i. Four weeks

    ii. Every four weeks

    iii. Four weeks from now

    iv. Four weeks ago

(d) If Alice tells you "see you around" and Betty tells you "see you later", whom do you expect to see again first? Given the same interaction in ASL (signs below), whom would an ASL native expect to see again first?