

CALCULATING MLU IN SIGN LANGUAGES

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Since Brown (1973), *Mean Length of Utterance (MLU)* has been an important concept in child language acquisition research. Despite the many factors which complicate its use as a measure of overall linguistic development (see, e.g., Dethorne et al. 2005) – especially for cross-linguistic comparison (e.g., Klee et al. 2004) – it has remained a commonly-used control measure for comparing children at different points of development (e.g., Rice et al. 2006).

A few studies have reported MLU measured in words or morphemes for children developing a sign language, but little explicit information about calculating MLU has been provided (e.g., Baker et al. 2009). There are numerous debates within the field of sign linguistics regarding the morphemic status of some elements, making certain decisions far from obvious.

This handout presents the coding decisions we have arrived at in our own studies. Our goal is to offer these methods to the research community for commentary and the eventual adoption of a systematic, uniform, comparable set of standards. Our procedures take as a starting point the transcription decisions detailed in Chen Pichler et al. (2010). On our method, the referential use of spatial loci, repetition for aspect or emphasis, pointing signs used in context, and verb-like emblems all contribute to the morpheme count. On the other hand, non-emblem gestures, non-manual markers, pointing signs outside of a sentential context, and repetitions with no change in meaning do not.

Detailed information is provided following. Comments and feedback are welcome.

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I. OVERVIEW

When calculating MLU, we obtain three counts:

- A. The number of **utterances** in a session. This includes all potentially analyzable utterances, whether included in the MLU analysis or not.
- B. The MLU in words (**MLU_w**). This analysis applies to a subset of all utterances (as described below). The mean number of words per MLU-analyzable utterance is calculated.
- C. The MLU in morphemes (**MLU_m**). This analysis applies to the same subset of utterances used for MLU_w.

II. PROCEDURES

A. *Utterances analyzed*

For longitudinal spontaneous production data, the analysis will generally include up to **100 MLU-analyzable syntactic units** (see II.B) (fewer are used if there are not 100 such units in the session). If the child is interacting with a less familiar interlocutor or in a less familiar situation (location, equipment, etc.), the first 10-25 utterances are skipped over.

B. *Syntactic Units*

Utterance breaks are determined as follows:

An utterance refers to a unit of signing divided by prosodic behavior (e.g., hands are lowered, a significant pause, etc.).

Some utterances may consist of more than one **Syntactic Unit**. For the purposes of coding MLU, Syntactic Units are used. A Syntactic Unit may include a single main clause, with any number of embedded or adjoined clauses, but not conjoined clauses. Clauses that might be analyzed as conjoined are treated as separate Syntactic Units.

C. *Inclusions/Exclusions*

Utterances are included or excluded from utterance or MLU counts as follows:

Excluded from utterance counts

1. **Unintelligible** utterances – An utterance which consists only of XXX or YYY is excluded from consideration.
2. An utterance that is a copy (exact **imitation**) of an interlocutor's utterance is not counted.
3. **IX produced in isolation** is not counted as an utterance for MLU. *EXCEPTION:* Pointing signs which have a modified movement to indicate more detailed location information are included (see II.E.4).
4. **Routines** – Memorized or fossilized words or sequences. Productions consisting solely of routines are excluded. (See Appendix for a list of common routines.)
5. **Individual frozen routines** – An expression that is used repeatedly by an individual child as a 'frozen' routine is counted once for the session, but not multiple times.
6. **Gestures** – May be used as conventionalized gestures in the hearing community also; not including emblems (see II.D.3) (see Appendix for a list of common gestures). Utterances which consist solely of a gesture are not counted.
7. Utterances which consist of **combinations** of the above (e.g., IX plus gesture) are not counted. *EXCEPTION:* Sequences of IX **are** included.

Included in utterance counts but Excluded from MLU calculation

1. **Partial utterance** – Usually occurs when a child is clearly interrupted by an interlocutor or self, and subsequently does not complete the utterance. Partial utterances are excluded from calculation of MLU. Fragments are not considered partial utterances, but are analyzed.
2. **Unintelligible portions** – If there is a XXX or YYY as part of an utterance, it can be counted for MLU_w, but not for MLU_m. [Note: transcribers should use more than one XXX or YYY in sequence when it is clear that more than one unintelligible word is used.] If a portion of an utterance is marked for a best guess, it is still counted as a regular utterance. [Note: Some utterances with XXX or YYY may be analyzed for different purposes when the intelligible material can be coded.]

D. Counting signs

1. The sign count should come from only those utterances that were **included** as MLU-analyzable. Anything that was excluded from the total utterance count or from MLU calculation should also be excluded from the total signs.
2. **IX used in sentences** does count toward MLU (although IX used in isolation does not; see II.C.3.).
3. **Emblems** – Used as conventionalized gestures in the hearing community but appropriated by the sign language. Verb-like emblems (come-here, etc.) are counted toward MLU. (See Appendix for a list of common emblems.) Note: non-emblem gestures are not counted.
4. Immediate **self-repetitions** of single signs with no pause are counted only once (e.g. BALL[+]). Self-repetitions that contribute to meaning are counted separately. Examples: WANT BALL WANT – counted as 3 signs, 3 morphemes. WANT IX(ball) <prosodic break> WANT IX(ball) – counted as 2 utterances, 2 signs each. A repeated form which contributes aspect or emphasis – counted as one sign, 2 morphemes.

E. Counting Morphemes

1. The morpheme count should come from only those signs that were **included** (II.D.1). Anything that was excluded from the total of signs should also be excluded from the total of morphemes.
2. **Spatial modifications** to signs to mark location or person – Each use counts as a morpheme. A verb moving from loc A to loc B would then have 3 morphemes. A noun signed ‘in a location’ would generally have 2 morphemes – one for the sign, one for the loc.
3. **IX, POSS, and SELF** directed toward a locus count as one morpheme.
4. **Pointing signs which have a modified movement** to indicate more detailed location information count as two morphemes (e.g., IX(around-the-corner). Note: such signs **are** included even when used in isolation (see II.C.3).
5. **Repetition** – Repetition for aspect or for emphasis counts as a morpheme. The same sign repeated within an utterance with intervening material will count separately (e.g., DOG IX(toy) DOG = 3 signs, 3 morphemes)
6. Proper names, lexicalized compound words, fingerspelling, and ritualized reduplications should be counted as only **one morpheme**.
7. **Non-manuals** – Do not contribute to MLU (in spontaneous production data, non-manuals cannot always be seen, so they are excluded to avoid a partial count). Mouthing is considered non-manual marking and thus not counted toward MLU. Head nod and head shake are also not counted.

III. APPENDIX

1. The following forms, *in isolation*, are considered **routines**:
 GOOD-BYE
 HI/ HELLO
 NO
 OK
 OH
 THANK-YOU
 YES
 the names of individual letters of the alphabet

2. The following forms are considered **emblems**:
 e(come-here) (palm toward signer, bending finger(s) in)
 e(cut-it-out) (open hand flicks palm toward ground)
 e(go-away) (flat hand flicks palm away from signer)
 e(hold-on) (full open palm repeatedly pushed forward in little movements)
 e(no) (index finger wags back and forth)
 e(stay-there) (full open palm pushed forward in one movement)
 e(stop-it) (full open palm pushed forward sharply once)
 e(wait-a-minute) (index finger held up toward waiter)

3. The following forms are considered **gestures**:
 g(clapping)
 g(forget-it) (flat hand bends down)
 g(here) (tapping a location with hand)
 g(hey) hailing someone
 g(hmm) (L hand on mouth with finger wiggle)
 g(huh) (two flat hands palm up) [NB: difference between g(huh) and sign WH – the sign is more tense]
 g(oops) (flat hand to mouth)
 g(ow) (flat hand, bent wrist, shakes)
 g(reaching) (arm fully extended)
 g(see-what-I-mean) (hands on hips, fex)
 g(voilà) (open hand indicates)
 g(well) (two flat hands flip to palm up)
 g(yea) (Deaf hand oscillation)