# Does iconicity benefit an L2 learner's comprehension?

## Leveraging iconic and referential strategies for comprehension of an unknown language

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## Background

- Iconicity in language can be loosely defined as mappings between form and meaning.[1]
- Languages in both modalities contain examples of lexical iconicity; however, sign languages have been suggested to demonstrate more than spoken languages.[1,2]
- Iconicity can also appear in non-lexical ways, such as via constructed action/role shift for identifying characters.[3,4]
- Language users also point (manually & non-manually with eye-gaze & torso orientation) for referential purposes and identifying characters.[4] (Fig. 1 & Table 1)
- Lexical iconicity can help support language learning[5], but whether iconicity & referential strategies can also support comprehension of sentences is less studied.
- This study examines whether iconicity & pointing in signed sentences provides comprehension support for non-signers and intermediate signers.

## Research Questions

1. Do perceivers' comprehension levels benefit from iconicity (either lexical or sentence-level)?
2. Do perceivers' comprehension levels benefit from familiar referential strategies (i.e. points in space)?
3. Does signing experience enhance these benefits?

## Methods and Materials

- Stimuli: videos of two bilinguals (English/Norwegian, American Sign Language [ASL]/Norwegian Sign Language [NSL]) producing short sentences in each language. Spoken language sentences contained no use of spatially iconic and referential strategies, but signed language sentences did (see Table 1)
- Example sentences:

  (7) The waitress brought a drink to the table but spilled it on the man sitting there.

  (8) Jerry opened the door, walked into the building, and said hello to a friend.
- Participants: N=50 English speakers (19 ASL learners [16 females] with 180+ hours of instruction; 31 non-signers [17 females]).
- For each sentence, participants were asked to:

a. identify the number of characters involved (response coded as "correct" or "incorrect"; see CID data)

b. report comprehension on a scale of 1-10 (1=low); see SRC data

c. answer short questions about the content, such as naming actions and other aspects of comprehension

- Responses to (a) & (b) analyzed using a generalized linear mixed model, random intercept for participant; pairwise comparisons using least square means with Tukey-Kramer adjustments for multiple comparisons

Fig 1. Locations in space used to distinguish one character (location C) from another (location E) via points in the ASL and NSL stimuli

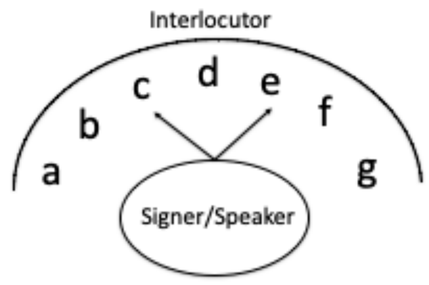
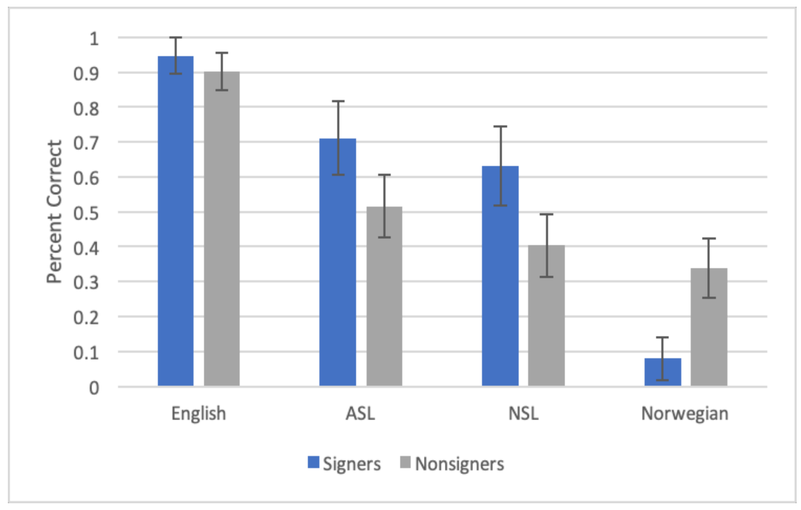



Table 1. Average number of referential devices per signed sentence

| | Eyegaze | Head Turn | Torso shift | Point |
|---|---|---|---|---|
| **ASL** | 1.13 (0.64) | 1.13 (0.83) | 0.5 (0.76) | 2.13 (0.99) |
| **NSL** | 0.88 (1.13) | 1.38 (1.5) | 0.13 (0.35) | 2.63 (0.74) |

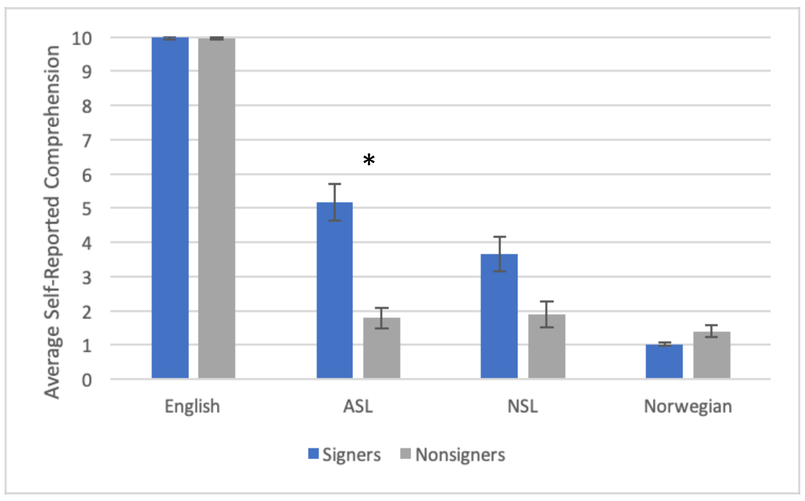
Note: Standard deviations expressed in parentheses.

Fig 2. Identification of number of characters (CID) by language




Note: Error bars represent standard error of the mean.

Fig 3. Self-reported comprehension (SRC) by language




Note: Error bars represent standard error of the mean.

## Results

**Quantitative Results** (select results due to limited space)

- Character Identification (CID) task:
  - **test language** ($F(3,334)=18.81$, $p<.0001$); **gender** ($F(1, 334)=3.79$, $p=.0522$) is nearly significant
  - **group x test language** ($F(3,334)=4.20$, $p=0.0062$)
  - Pairwise comparisons revealed that **all languages differed from each other, except ASL & NSL**.
  - Pairwise comparisons revealed **no differences between groups per language** (ASL: $t(334) = -1.07$, $p=0.9630$; NSL: $t(334)= -0.79$, $p=0.9936$; Nor: ($t(334)=2.84$, $p=0.0878$). **Differences for signers: ASL & Nor. , NSL & Nor**., not Eng. & ASL, or ASL & NSL.
- Self-reported comprehension (SRC):
  - **group** ($F(1,319)=4.95$, $p=0.0267$; **test language** ($F(3,319)=494.44$, $p<.0001$);
  - **group x test language** ($F(3,319)=17.68$, $p<.0001$)
  - Pairwise comparisons revealed **signers reported higher SRC scores in ASL over non-signers**.

**Qualitative Results:**

- Review of participant responses revealed that despite their self-reported comprehension (SRC) scores, many understood parts of the signed sentences.
- Example: Participant 5 (non-signer) had an SRC score of 1. However, when asked to describe sentence 8 (see Methods), she responded: "Maybe someone opened the door and left and another person said bye," correctly identifying the action of opening and the presence of two characters.
- Note: CID score for Norwegian was boosted for non-signers by two words with familiar pronunciations: a proper noun and a cognate verb between the two languages.

## Discussion

- Comprehension levels can benefit from character-based iconicity (e.g., cases of constructed action).
- Referential strategies, particularly similarities between signed pronouns and gestural points also provided benefit to comprehenders. The signed sentences contained more instances of referential points than torso shift (see Table 1), contributing to this benefit.
- Based on these tasks & these data, signing experience does not enhance the benefits of iconicity.
- Words with familiar pronunciations can assist a non-user of a language with respect to comprehension (Norwegian).
- All participants (both signers and non-signers) were more successful on the CID task than their self-reported comprehension rates would suggest.
- Further work is needed to examine why females are nearly outperforming males.

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## References

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